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AUG 1 7 1919
Department of Agriculture

Rock Products

$2.00 A YEAR | CHICAGO | AUGUST 16, 1919

IMPROVED

Keystone Kiln

The engineers in charge of Lime Kiln design and construction after a number of years of experimenting and trial have now put forth the design of the "Improved Keystone" Kiln. As has been the custom with the management of the Steacy-Schmidt Mfg. Co., in carrying out its conservative policy, no attempt was made to put this "Improved Keystone" Kiln on the market until after it had been tried out and found to be a wonderful step in advancement in the construction and operation of shaft kilns.

To Prospective Lime Producers:

You should lose no time in getting in touch with the "Improved Keystone" Kiln which is as far ahead of the original "Keystone" as the "Keystone" outdistances all its competitors.

To the Users of the 237 "Keystone" Kilns:

Your "Keystone" Kiln can be fitted with improvements which will bring your Kiln up-to-date. This change will involve a minimum expense considering the increased output resulting from the use of this new type known as the "Improved Keystone" Kiln.

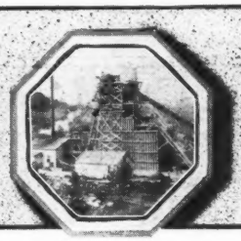
HYDRATION

The time is now here when every lime operator should install a Hydrating Plant. We can fit the Hydrating Plant to your present lime plant and prove to you how you can increase your profits. Let us tell you why you should install a Hydrating Plant in connection with your lime burning plant.

Steacy-Schmidt Mfg. Co.
York, Pennsylvania

J.C. BUCKBEE CO.
Engineers

First National Bank Building
CHICAGO



We solicit inquiries from those who contemplate constructing complete cement, crushed stone, agricultural stone, lime burning and gravel plants, or remodeling their present installations.

What we have done in putting other plants on an efficient, paying basis we can do for yours. Details are ready for your consideration.

Examinations, appraisals and reports made for purposes of finance and income tax returns.

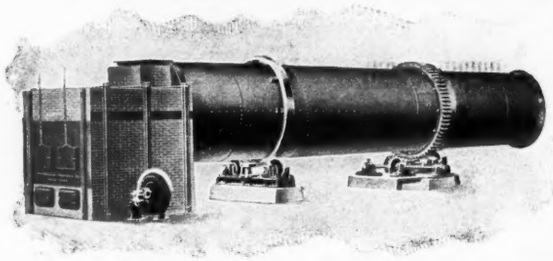
We are prepared to finance meritorious properties.

"PENNSYLVANIA" Hammer Crushers

PATENTED

For Crushing and Pulverizing Lime, Limestone, Gypsum, Marl, Shale, Etc. Main Frame of Steel, "Ball and Socket" Self Aligning Bearings; forged Steel Shaft; Steel Wear Liners; Cage adjustable by hand wheel while Crusher is running. No other hammer Crusher has such a big Safety Factor.

Pennsylvania Crusher Company
New York PHILADELPHIA Pittsburgh



DRYERS
AMERICAN PROCESS CO. 68 Williams Street NEW YORK CITY

USE JAITE PUNCTURE AND WATERPROOF BAGS
FOR SAFE DELIVERIES

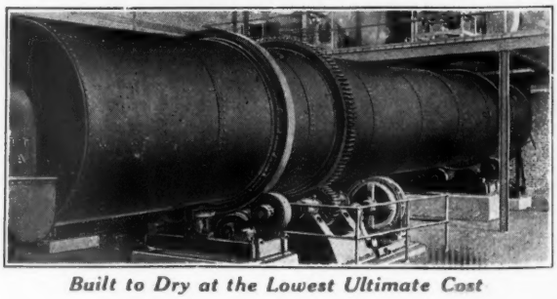
ATTENTION
Cement Manufacturers and Supply Dealers

Some of our customers who are using our Puncture and Waterproof bags report one-third increased sales to their satisfied customers. Also report breakage for 1917 and 1918 from all causes only one-half of one per cent.

THE JAITE CO.
JAITE, OHIO
Sole Manufacturers

Ruggles-Coles Dryers

for coal, clays, sand, stone, etc. They will burn less fuel than any other type and with their low power and repair costs are most economical to operate.



Built to Dry at the Lowest Ultimate Cost

Ruggles-Coles Engineering Co.
McCormick Building Chicago
50 Church Street New York
WORKS: YORK, PENNSYLVANIA

BROWNING LOCOMOTIVE CRANES
"The All-Around Champions"
BROWNING
"Buckets That Bite"
Both are time and money savers

Write for Catalogs

THE BROWNING CO.
Cleveland, Ohio
Sales Offices:
New York Chicago

Saying, "I saw it in ROCK PRODUCTS," will bring quick action

ROCK PRODUCTS is published every other week by Tradepress Publishing Corporation, 542 So. Dearborn St., Chicago. Subscription: $2.00 a year in the United States, $3.00 in Canada. Entered as second class matter July 2, 1907, at the postoffice in Chicago, under Act of March 3, 1879.

VOL. XXII—No. 17
Aug. 16, 1919

Rock Products seeks and reports everything of interest to producers of crushed stone, sand, gravel, lime, cement, gypsum products, agricultural limestone, phosphate, potash and glass sand. It spends many times more money than any other journal of the industry to compile its message every two weeks. Appreciate Rock Products.

Rock Products

26 Big Issues for $2

Stands without a peer in the industry. It serves the plant owners without stint or bias. Its reading pages are loaded with pictures and news.

Its advertisements are on advertising pages—where in fairness to all—they belong.

Read Rock Products—not because it serves you unselfishly but because it is the best paper. Subscribe!

Fill Out and Mail the Coupon—Now!

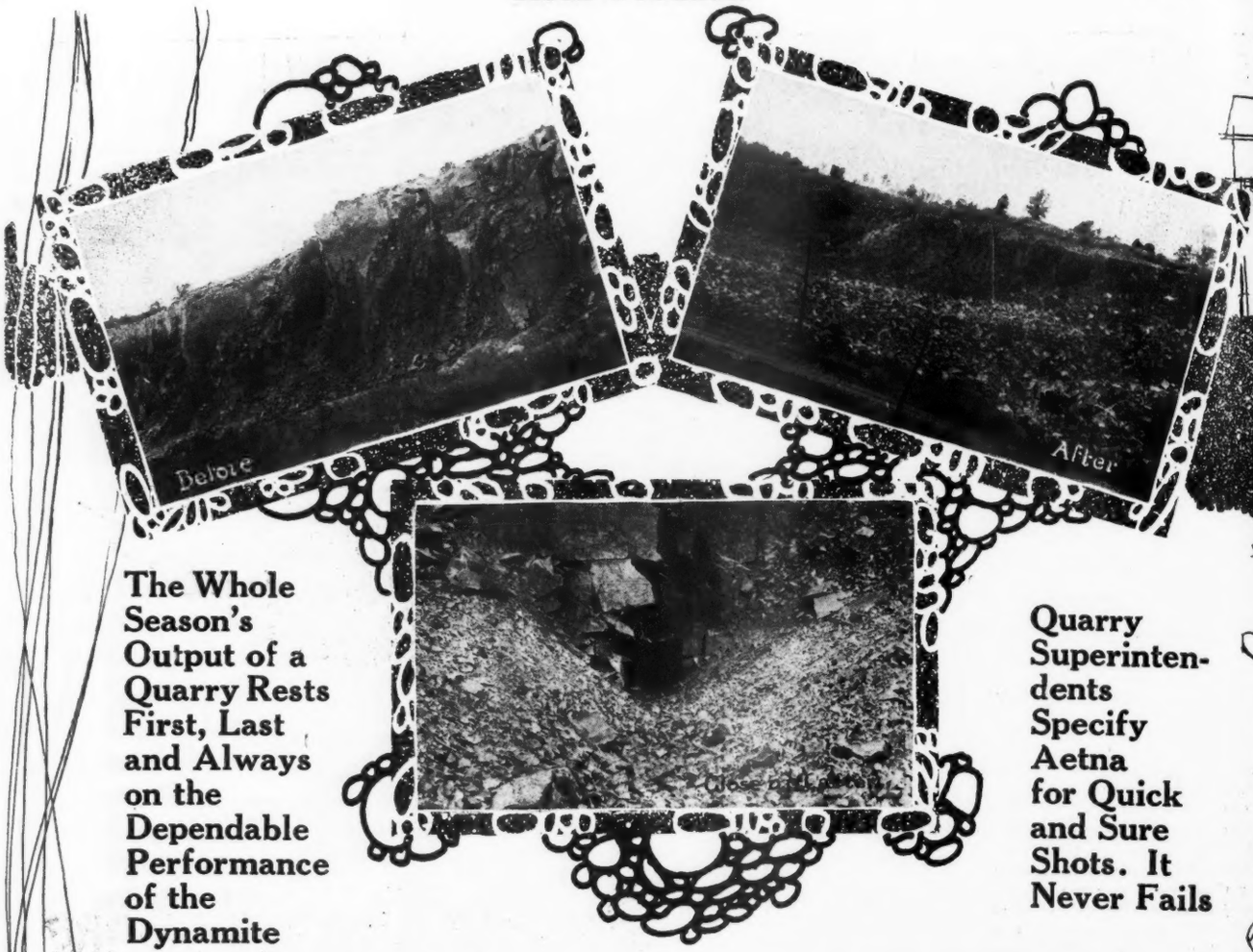
ROCK PRODUCTS, 542 So. Dearborn St., Chicago

Here is my $2.00 for a full year's subscription to ROCK PRODUCTS.

Name.....

Address.....

Saying, "I saw it in ROCK PRODUCTS," will bring quick action



The Whole Season's Output of a Quarry Rests First, Last and Always on the Dependable Performance of the Dynamite

Quarry Superintendents Specify Aetna for Quick and Sure Shots. It Never Fails

40 Tons of AETNA DYNAMITE

Used in One Charge, Excavated

250,000 Cu. Yds. of Rock

Dresser Junction Quarry of
Trap Rock Co., Minneapolis, Minn.

Aetna Explosive Co., Inc.

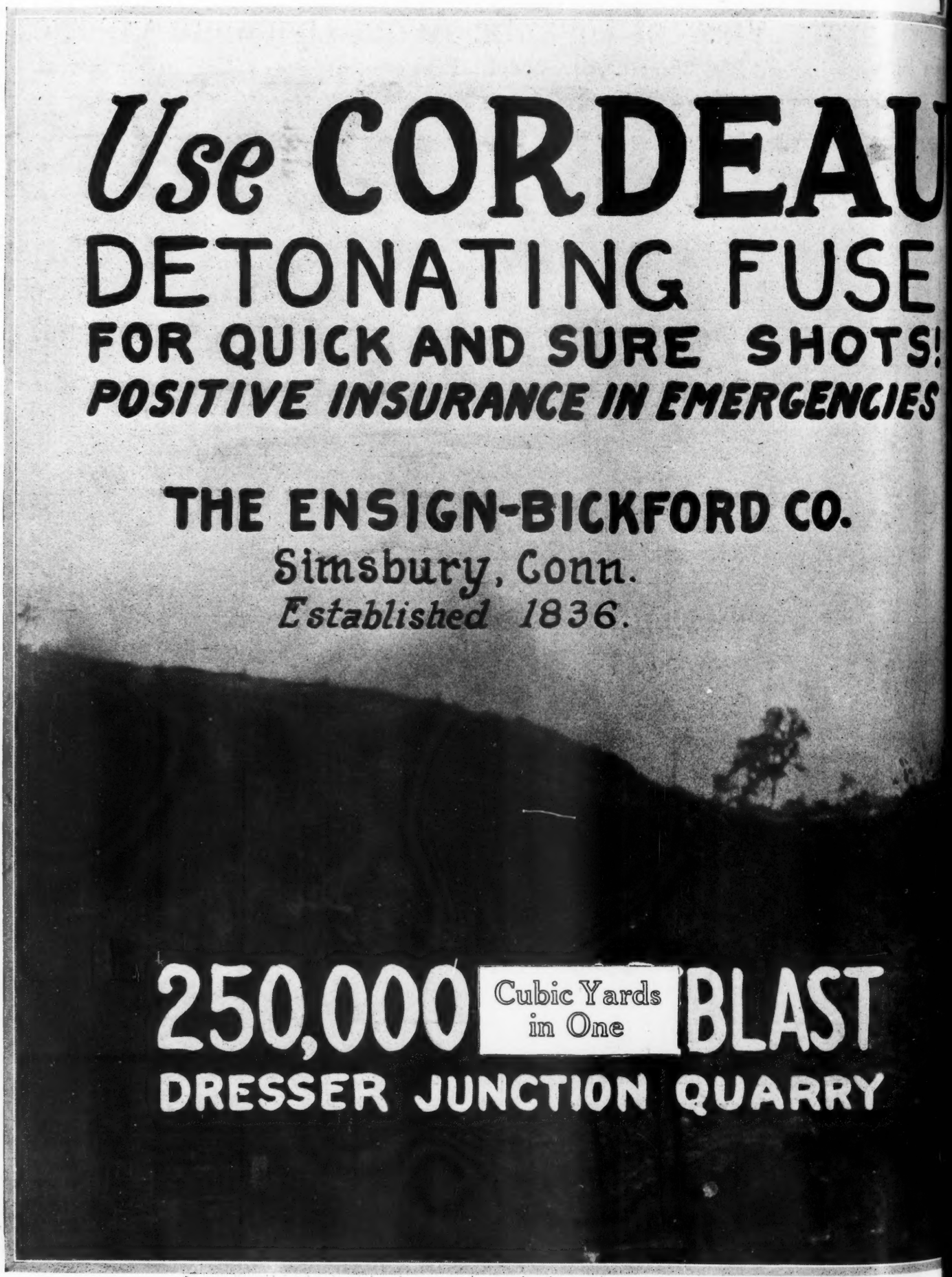
New York, New York

Cooperation is the thing—please mention ROCK PRODUCTS

Larger View of Gigantic Aetna Dynamite Charge

Throwing out 250,000 cu. yds. of rock. Biggest blast ever set off in Northwest.

The movie camera that was used to make this picture was completely smashed. Operator was standing 600 feet from blast.


Use CORDEAU
DETONATING FUSE
FOR QUICK AND SURE SHOTS!
POSITIVE INSURANCE IN EMERGENCIES
THE ENSIGN-BICKFORD CO.
Simsbury, Conn.
Established 1836.
250,000
Cubic Yards in One
BLAST
DRESSER JUNCTION QUARRY

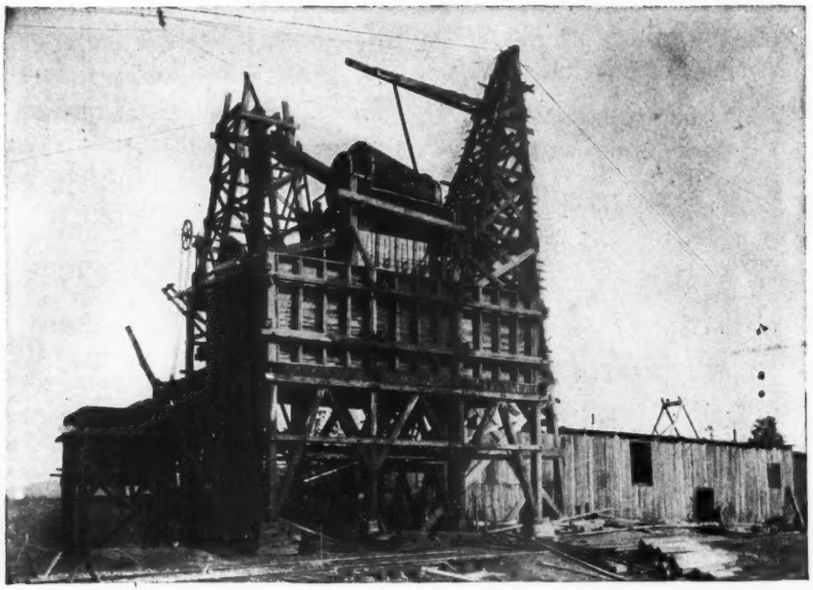
-BICKFORD

Success of blast at Dresser Jct. Quarry of Trap Rock Co., of Minneapolis insured by Cordeau-Bickford detonating fuse—

Regardless of the number of circuits, wise quarry men invariably use Cordeau-Bickford fuse.

Webster Equipped

Sand and Gravel Plants



Engineered to provide commercial economy in operation and production

This company does more than manufacture good machinery.

Our engineers render the buyer of Webster Equipment a far reaching service.

The physical conditions of each sand and gravel plant site are studied. Likewise the market conditions.

Plants are designed that will do the work required at a minimum cost and in the most effective way.

The same form of service applies to elevating and conveying machinery for cement and chemical plants.

Upon request and without obligation to you Webster Engineers will study your requirements and make recommendations.

(263)

THE WEBSTER M'F'G COMPANY, TIFFIN, OHIO

New York Boston Cincinnati Chicago

Sand and Gravel Plant Machinery, Screens, Conveyors, Feeders, Drives, Friction Clutches, Etc, Etc.

Prompt attention will be given your inquiry if you mention ROCK PRODUCTS

Seven of the eight Worthington Plants are now accepting orders for immediate shipment

DURING the war, notwithstanding the fact that our factories produced more than ever before, it was sometimes impossible for us to guarantee delivery dates even months in advance.

But now, seven of our eight plants can ship standard Worthington equipment on receipt of the order. And the other plant—which is working night and day to clean up work left over from the war — will also soon be able to meet normal demands.

For it is peculiar of the products we supplied for war purposes that they are the same in type and character as our peace-time products. So that each of our factories, as it stops making war products, resumes immediately, without alterations, the production of machinery for the open market.

It is, therefore, now possible to ship immediately almost any standard Worthington product; and where an emergency must be met with specially designed equipment, the same facilities which made our war records possible will be called on to their fullest extent.

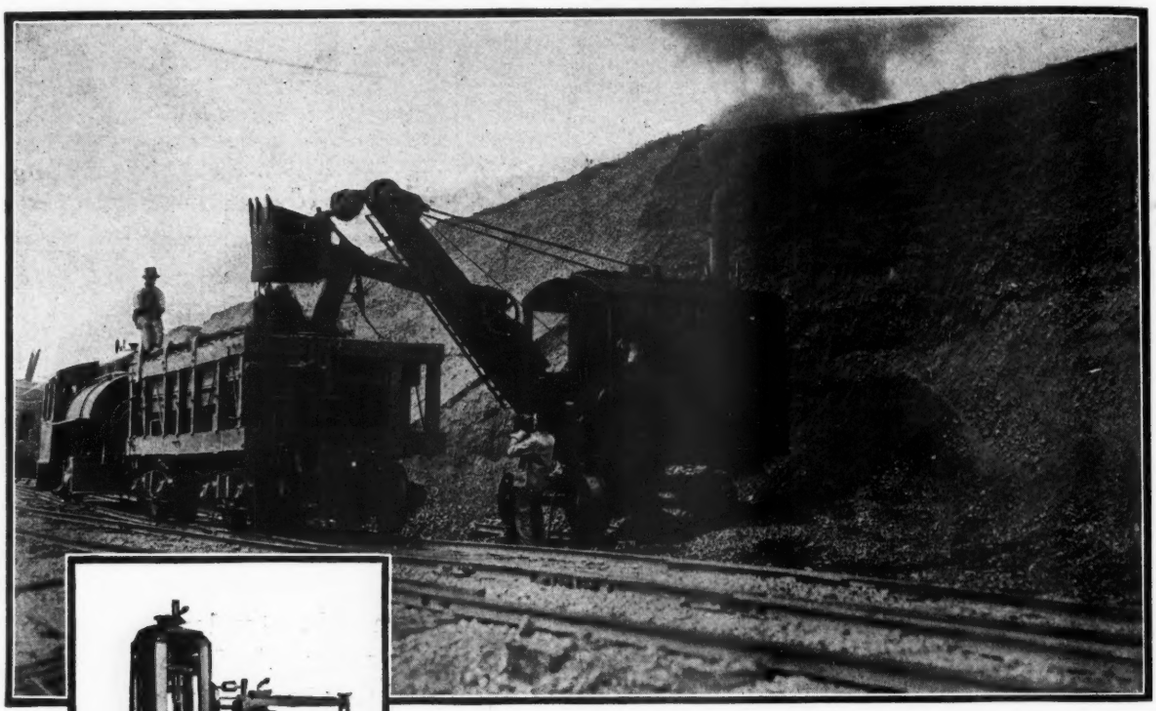
WORTHINGTON PUMP AND MACHINERY CORPORATION
Executive Offices: 115 Broadway, New York City
Branch Offices in 24 Large Cities

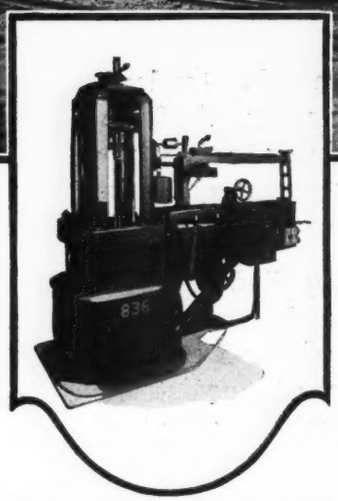
PUMPS-COMPRESSORS-CONDENSERS-OIL & GAS ENGINES-METERS-MINING-ROCK CRUSHING & CEMENT MACHINERY

WORTHINGTON

Deane Works, *Holyoke, Mass.* Hazleton Works, *Hazleton, Pa.* Laidlaw Works, *Cincinnati, Ohio* Gas Engine Works, *Cudahy, Wis.*
Blake & Knowles Works *East Cambridge, Mass.* Worthington Works *Harrison, N. J.* Power & Mining Works *Cudahy, Wis.* Snow-Holly Works *Buffalo, N. Y*

To say you saw the ad in ROCK PRODUCTS gives tone to your inquiry





Testing machine in physical laboratory at the "Marion" plant to determine the strength of various individual parts of "Marion"-built equipment. We have several such machines and keep them busy!

Steady Plugging Sure Does Count!

The H. D. Conkey Sand & Gravel Co. uses a "Marion" Revolving Shovel to dig gravel from a 25-foot bank at Yorkville, Ill., 40 miles from Chicago.

Without any noise, fuss or fireworks, this little outfit plugs steadily away for 9 months out of 12, so regularly that it hardly misses a single scoop the whole day through. The shovel averages 300,000 tons a year and during its first three years suffered *only one breakdown*—even that was not serious nor directly the fault of the shovel itself.

The owners are thoroughly "sold" on their machine—naturally enough. So are hundreds of other "Marion" users in sand, gravel and clay plants, stone quarries, etc. So will *you* be when you get fully "Marion"-wise. Why not ask for particulars today?

THE MARION STEAM SHOVEL COMPANY

Established 1884 Marion, Ohio

CHICAGO NEW YORK SAN FRANCISCO

Marion

It gets immediate attention if you mention ROCK PRODUCTS

THE TELSMITH BOLT-SHAFT BREAKER—

Advertisement Number Two—

Time was when Telsmith alone dared to talk about "short shafts," "big eccentric bearings" and "automatic oiling systems"; but the old order is changing rapidly. The engineering fraternity has accepted the pillar-shaft breaker as marking an important step forward in rock crushing practice; and short-shaft crushers are distinctly in vogue.

But the extent of the Telsmith forward movement is not always fully appreciated. Telsmith design does not merely effect an economy of head-room, although it generally saves thirty per cent. in mill height. Nor does Telsmith merely eliminate frame, shaft and spider breakages, although casualties of this character seldom occur when Telsmith equipment is used. The big eccentric bearings are splendid features of Telsmith design—but not the most important. Lubrication by oil under pressure is a noteworthy Telsmith idea, but not **the** big idea. The enormous crushing and receiving areas—25-35% greater than in any other gyratory—are points of prime importance; but

The one BIG FACT in Telsmith design is the **parallel stroke**—the aggressive initial pinch—the horizontal gyration with the same big "bite" at the top of the head as at the bottom. That long, hard grip means fast, effective feeding—quick action on the big chunks—less labor over the crusher—less labor in the quarry—more capacity. It saves you money; and it deserves your investigation. We will gladly send you catalog No. 166 covering Telsmith Breakers and Bulletin No. 2F11 covering Telsmith Reduction Crushers. Just drop us a line.

SMITH ENGINEERING WORKS

3188 Locust Street **MILWAUKEE, WIS.**

545 Old Colony Building
Chicago, Ill.

30 Church Street
New York City

930 Oliver Building
Boston, Mass.

Garfield Bldg.
Cleveland, Ohio

325 W. Main St.
Louisville, Ky.

Franklin and Channing Aves.
St. Louis, Mo.

523 Boston Building
Denver, Colo.

Salt Lake Hardware Co.
Salt Lake City, Utah

Road Builders Equip. Co.
Portland, Ore.

"ONE MAN – ONE MINUTE"

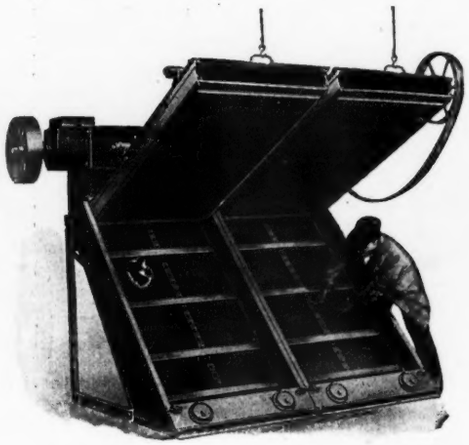
STURTEVANT "OPEN-DOOR" MACHINERY

"Open-Door" One Man-One Minute Plant

COMPLETE CRUSHING, GRINDING, ELEVATING AND SCREENING PLANTS, FOR HARD OR SOFT MATERIALS.

MACHINES OF STURTEVANT "OPEN-DOOR" CONSTRUCTION.

EVERY PART ALMOST INSTANTLY ACCESSIBLE, SO THAT ONE MAN CAN SWING THE EASILY OPENED DOORS AND REACH EVERY PART, FOR INSPECTION, CLEANING OR REPLACEMENT.



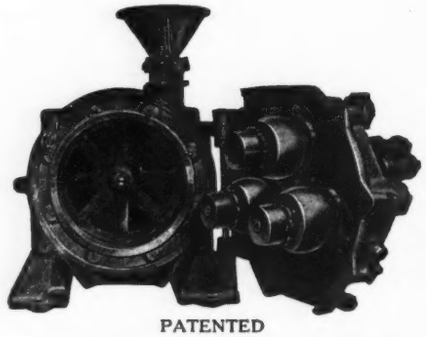
Labor Saving—Owing to the Open Doors one man can do the work of many men in much less time.

Minutes replace hours of valuable time (overtime and Sundays).

Continuous Operation—Production depends upon the amount of time plant is in operation and the condition of the machinery. Quick access means quick repairs and minimum time lost in shut downs.

Ease of getting into machine for adjustment, replacement and inspection without long stops allows you to keep machines in perfect condition, and at maximum production.

Shut downs are costly, non-productive labor and loss of output soon devour profits. Inaccessible machinery has no place in a modern plant.



PATENTED

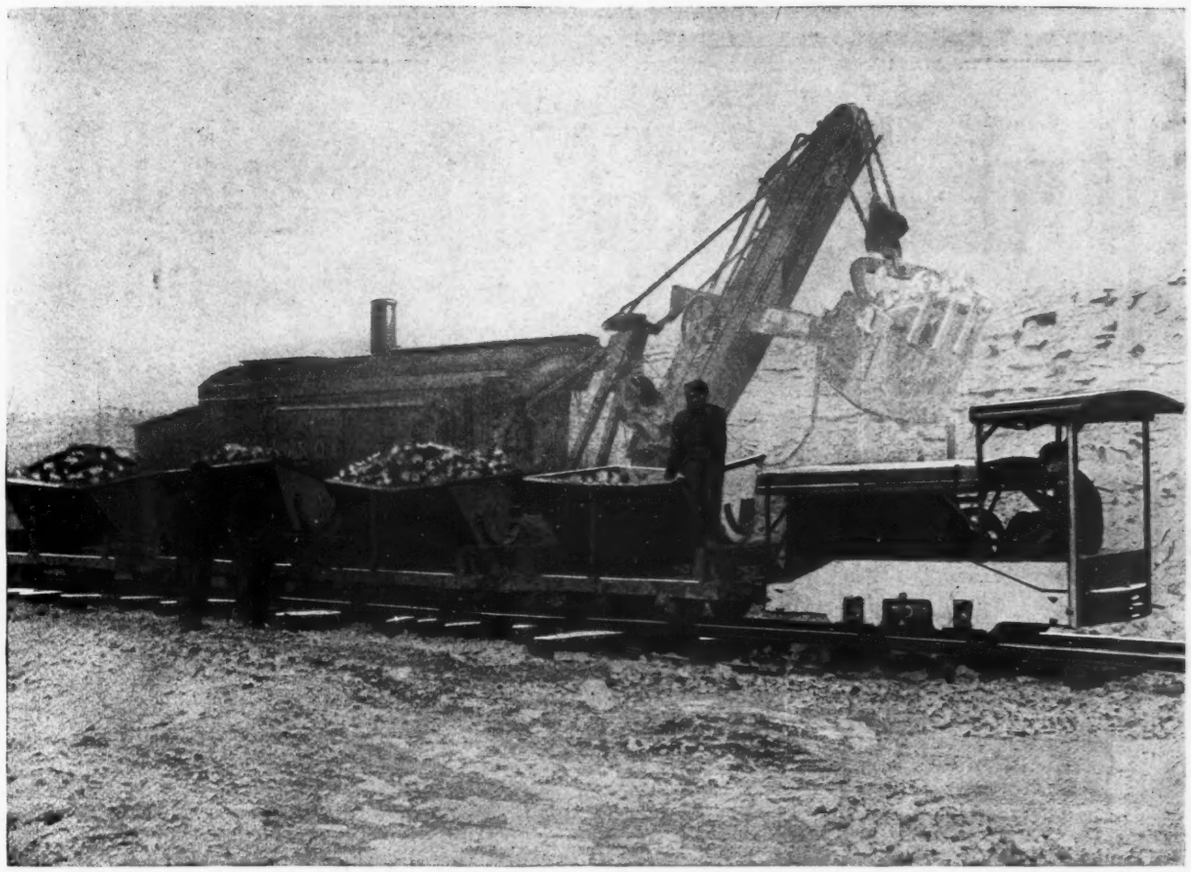
PURCHASE ALL OF YOUR CRUSHING, GRINDING, SCREENING, CONVEYING, WEIGHING AND MIXING MACHINERY, INCLUDING SPOUTS, CHUTES, HOPPERS, ETC., FROM ONE CONCERN.

WE ARE EXPERTS IN MODERN DESIGNS, AND SPECIALISTS IN THIS TYPE OF MACHINERY.

SEND FOR CIRCULAR

STURTEVANT MILL CO., BOSTON MASS.

HARRISON SQUARE



PLYMOUTH
Gasoline Locomotives

"Why They Jumped From Coal to 'Gas'"

J. H. Herzog & Son, Patterson, Ohio, used to think their steam locomotive was just about "it". But when they gave a "Plymouth" Gasoline Locomotive a tough test—exit the steam dinky.

"We cannot praise the "Plymouth" too highly" they write—and then, having had experience with both coal and "gas" systems, they point out these very real advantages of a "Plymouth" installation:

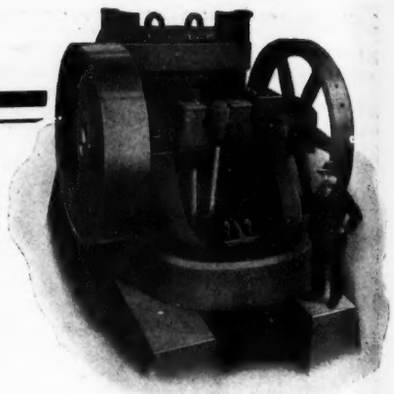
In first cost a "Plymouth" is far below a steam locomotive rated to do the same amount of work. A "Plymouth" is cheaper in maintenance and operation. Repair work is infrequent and minor in character. Fuel and oil—5 gallons of gasoline and 1 quart of lubricant per day—cost much less with the "Plymouth" than with the steam engine. Average untrained help drawing ordinary day's wages may operate a "Plymouth"—a licensed engineer at a high daily wage is required for a steam outfit.

Considering every factor—cost, power, stamina and dependability—"Plymouths" are the most efficient of mechanical or animal haulage systems, and are proving it by replacing older hauling methods in the leading stone quarries and cement mills.

Write us about your particular problems; let us send Haulage Booklet describing typical "Plymouth" installations.

THE FATE-ROOT-HEATH COMPANY, 210 Riggs Ave., PLYMOUTH, OHIO

New York Philadelphia Norfolk Pittsburgh Cleveland Detroit Chicago St. Louis Kansas City Minneapolis Portland



There's a Reason—

IN MAY, 1916

the General Crushed Stone Co. purchased their first Traylor Jaw Crusher, a 66″ x 86″—

IN NOVEMBER, 1918

a 42″ x 48″ Traylor "Bulldog" Jaw Crusher—

IN JANUARY, 1919

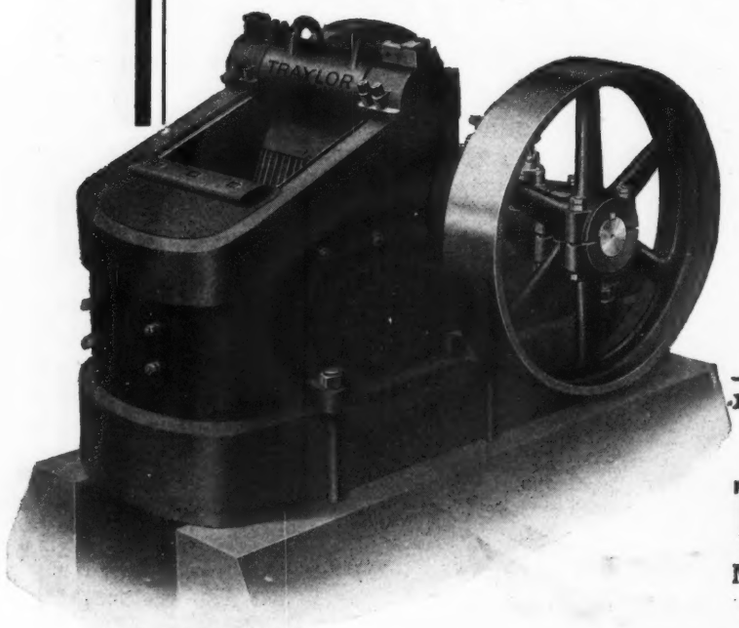
a 48″ x 60″ Traylor "Bulldog" Jaw Crusher—

IN JULY, 1919

their fourth order comes in for another 42″ x 48″ "Bulldog."

BULLETIN RJX-1

will tell you why they wouldn't even consider any other make of crusher. You'll appreciate those reasons as applied to yourself.



Doesn't That Mean Something to You ?

Traylor Engineering & Mfg. Co.

Main Office and Works: Allentown, Pa.

New York	Chicago	Los Angeles	Spokane
30 Church St.	1414 Fisher Bldg.	Citizens Bk. Bldg.	Mohawk Bldg.

The advertiser wants to know that you saw his ad in ROCK PRODUCTS

Wire Rope
of Proven Quality

Williamsport Wire Rope measures up to the quality-requirements which you expect of Bourne-Fuller Goods.

There's more than thirty years of rope-making experience behind it—and more than thirty years of making good in all the varied uses of wire rope.

When you buy Williamsport Wire Rope, with Bourne-Fuller Service, you are buying the maximum of value and satisfaction.

Standard sizes and constructions, bright or galvanized, lengths as desired. Catalog and discounts on request.

Bourne-Fuller

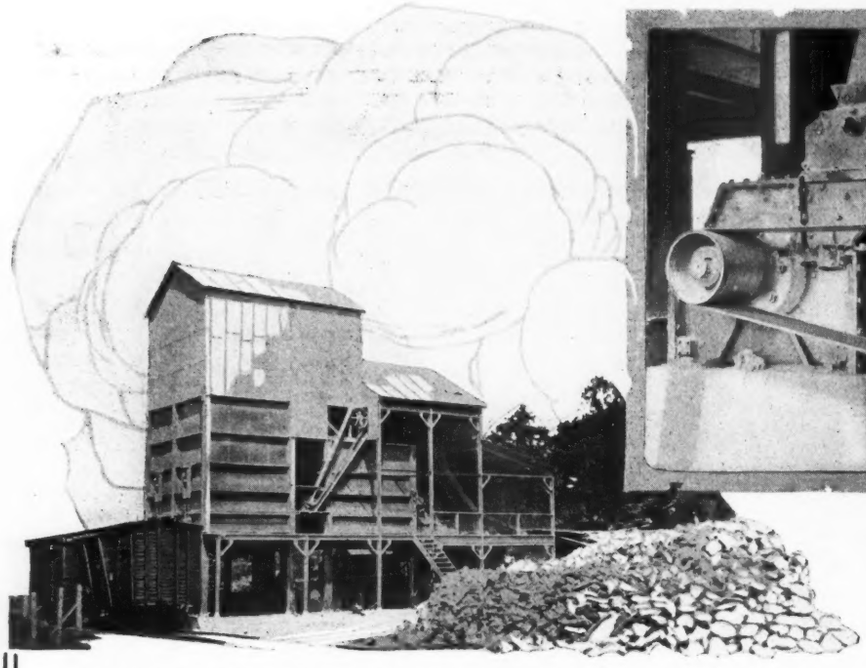
THE
BOURNE-FULLER CO.

Iron, Steel
Pig-Iron
Coke

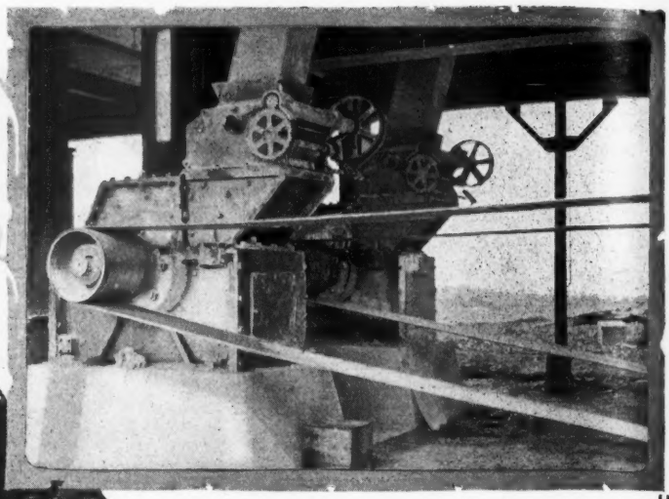
CLEVELAND

Pittsburgh Cincinnati Chicago
Detroit New York Toledo

You will get entire satisfaction if you mention ROCK PRODUCTS



This plant completely designed and Elevators, Pulverizers and Screens furnished by the Jeffrey Manufacturing Co.



Jeffrey Type "D" Pulverizers in operation at the State of Virginia Lime Plant, Staunton, Va.

Plants of the Leading Quarry Operators Are Being Equipped With

Jeffrey Type "D" Ball Bearing Pulverizers

for increasing their capacities to meet the constantly increasing demand for ground limestone.

Especially Adapted for Making Agricultural Limestone

Write for Catalogue 147-D giving full information

The Jeffrey Mfg. Co., 935 North Fourth St. Columbus, Ohio

New York, Boston, Philadelphia, Cleveland, Pittsburgh, Chicago, St. Louis, Birmingham, Dallas, Milwaukee, Seattle, Denver, Montreal, Detroit

Manufacturers of Pulverizing, Conveying and Elevating Machinery; Chains; Self-Propelling Loaders; Electric Trolley and Storage Battery Locomotives, etc.

Explosives

for every blasting requirement

for

Road Building
Excavating
Ore Mining
Coal Mining
Quarrying
Demolition
Agriculture

More than 100 Different Kinds

Dynamite
Permissible Explosives
Gelatin Dynamite
Blasting Gelatin
Extra Dynamite
Oil Well Explosive
Quarry Powder
Farm Powder
Low Powders
Blasting Powders
Sporting Powders
Blasting Supplies

Atlas Explosives are manufactured with specific characteristics for different classes of work. The various Atlas brands differ in strength, quickness, sensitiveness, resistance to cold, fumes evolved on detonation and resistance to water, according to the requirements of the work for which the explosive is to be used. The qualities most needed in one class of work may be worthless or actually derogatory in another.

To insure Atlas users getting the best results with the greatest economy of time, labor and money, we maintain the Atlas Service Division. Here is a corps of experts who are thoroughly conversant with the exact properties of every explosive and the most efficient methods of using them.

When you are in doubt on any question pertaining to explosives write and explain your troubles to our Service Division. They will give you the correct solution to your problem and, if necessary, will send a specialist to determine just what methods you should use to get the best results. This Service is without charge.

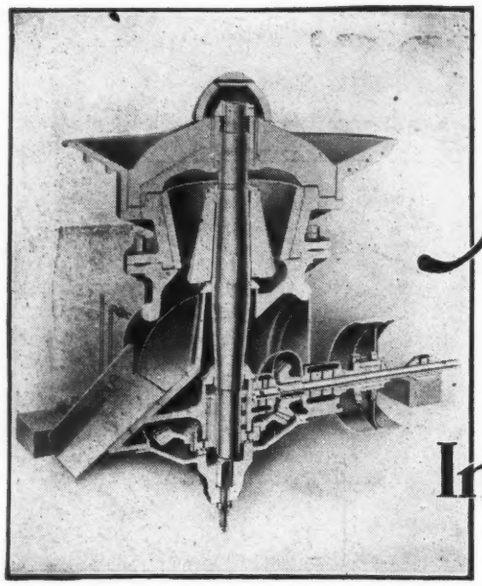
ATLAS POWDER COMPANY

Wilmington, Del.

Branch Offices: Allentown, Pa.; Birmingham, Ala.; Boston; Chicago; Des Moines, Ia.; Houghton, Mich.; Joplin, Mo.; Kansas City; Knoxville; McAlester, Okla.; Memphis; Nashville; New Orleans; New York; Philadelphia; Pittsburg, Kans.; Pittsburgh, Pa.; Pottsville, Pa.; St. Louis; Wilkes-Barre.

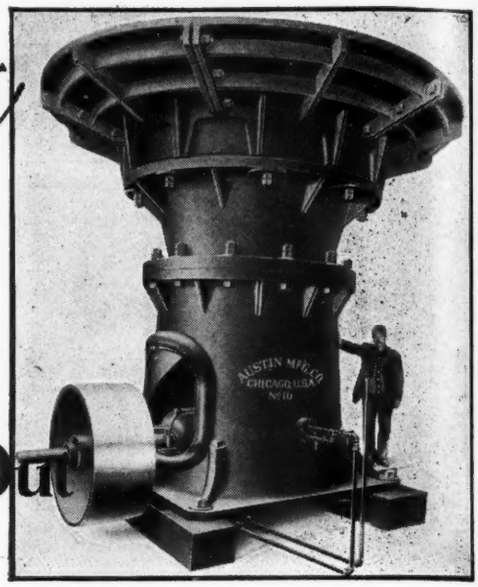
ATLAS EXPLOSIVES

To say you saw the ad in ROCK PRODUCTS gives tone to your inquiry



Austin
Rock Crushing Equipment

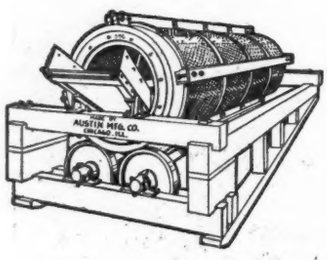
Examine *both* Inside and Out



THE more you look into the internals of the Austin Gyratory Rock Crusher, the better we are pleased. For the real mechanical superiority of any machine lies in its working parts. When a prospective user examines the details of the Austin Crusher he finds numerous practical features not found in others —features which insure greater durability and output with little wear and tear and less horse power consumed.

Austin screens, elevators, quarry cars, hoists, etc., as well as the gyratory crusher, are looked upon as "standard" by quarrymen and engineers who know what good machinery is.

Our new quarry equipment catalog, fully illustrated, and descriptive of the entire Austin line, is now available and will be sent to you upon request.



We manufacture the following machines:

Gyratory Rock Crushers
Motor Tandem Rollers
Macadam Rollers, Steam and Motor
Portable Stone Bins
Stone Elevators
Stone Screens
Elevating Graders
Road Scarifiers
Street Sprinklers
Horse Drawn Rollers
Street Sweepers, Horse and Motor
Dump Wagons
Stone Spreaders

Austin Manufacturing Company

Karpen Building, Chicago, Ill.

Branch Offices: **New York** **San Francisco**

Rock Products

TRADEPRESS PUBLISHING CORPORATION
542 SOUTH DEARBORN STREET
CHICAGO

NATHAN C. ROCKWOOD, Editor — C. F. TREFZ, Associate Editor

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Statements of Importance to Truck Buyers

THE following group of statements made by The White Company in recent advertising summarizes the achievements of the White Product—the White fleet growth, mileage records, honors won in commerce and war; reviews the factors of strength and permanence back of every owner's investment in White Trucks.

All bear on one simple fact: the real value of a motor truck; its *ability to do the most work for the least money under all conditions.*

"Year after year this list grows. It is something more than a list of well-known concerns owning ten or more White Trucks. It represents *a yearly progress in added trucks per owner*—the most extensive growth of individual fleets ever published by a truck maker.

"There are now 2774 White Fleets in actual service, totaling 33,139 trucks, exclusive of all single truck installations."

"The ultimate mileage of White Trucks is still unmeasured. Some have rounded out 300,000 miles. Many have run 200,000 miles. Hundreds, probably thousands, have passed the 100,000 mark—a very common White performance."

"The purchaser of a White Truck backs his investment in it with the strength of The White Company, with its years of successful experience, with its thousands of trained employees, with its tens of thousands of trucks in active service, with its millions of capital and a service organization, nation-wide, which has no parallel in the industry."

The complete statements, in pamphlet form, will be sent upon request

THE WHITE COMPANY
CLEVELAND

Rock Products

Vol. XXII Chicago, August 16, 1919 No. 17

Prices and Profits in the Rock Products

Increases in Prices of Rock Products Have Been Much Less Than Other Commodities—Will the Good Suffer with the Bad?

WAR CONDITIONS gave American producers and manufacturers a greater license to organize and eliminate destructive competition than they had ever enjoyed before. Powerful influences were brought to bear to compel the organization of trade associations. Indeed they were made necessary by the very same administration which is about to prosecute some of them.

Under such license it is perhaps inevitable that some (hogs) should abuse their privileges and gouge every one within their power for their own profit. In many cases the profit in such commodities as foodstuffs, copper, and leather (particularly notorious examples) have been out of all reason. There may be any number of theories as to why the prices of such commodities have increased by leaps and bounds, but every thinking man knows that it has been done by the elimination of competition through organizations of producers and sellers.

The elimination of *destructive competition* is a public benefit. It prevents economic waste which the public must pay for in some form. The public had just begun to realize this when our profiteering friends ran wild. The result is that all organizations of producers and sellers have come under suspicion of both local and federal investigators.

Unless such investigations are conducted in a fair and open-minded way the end may be a serious curtailment of trade association activities, at a point where they are just beginning to prove their value to members. This, however, is no time for slowing up association work, nor of allowing a fear of investigation to keep out prospective members.

There never was a time in the history of American industries when strong national trade associations were more necessary than now, and he is a cold-footed producer who curtails his association support one iota because of any prospective government investigation.

It is notorious that the increase in prices of lime, cement, sand, gravel, crushed stone and gypsum throughout the country have barely kept pace with increases in wages. It is only too well known among the producers themselves that all their profits so far this year are prospective, depending upon their being able to attain capacity production—which under present conditions of labor shortage and turnover, car shortage, freight rate increases, and all other kinds of bottled H—l appears quite probable(?).

The same holds true to some extent in regard to all building materials. The executive committee of the National Federation of Construction Industries is authority for the following:

> It is the good fortune of the country and to the credit of the construction industry, that the prices of building materials and construction in general have increased twenty-three per cent less than the price of other commodities, and that the pre-war dollar will thus go farther in buying buildings than commodities in general. This has occurred in spite of the facts that the prices of building materials have been greatly affected by the prices of other commodities and that freight rates on building materials have as a class been increased twice as much as those on other commodities.

Under such conditions producers in the rock products industries have little to fear from investigations other than possible cold feet on the part of their officers and members.

Floating Dredge at Western Indiana Gravel Plant, Terre Haute, Ind.

One of the Most Complete Floating Dredges in the Middle West—Plant to Operate on Three Eight Hour Shifts Per Day

THE FLOATING DREDGE used by the Western Indiana Gravel Co., at Terre Haute, Ind., to remove gravel to a depth of 40 ft. below water level, is one of the most complete of its kind in this part of the country. This boat is now in its fourth year of successful operation and is in just as good condition as when installed in 1916. The accompanying picture shows the plant at that time and at present and it remains the same with the exception of a new screening tower which has been erected to facilitate the production of gravel in compliance with the specifications of the Illinois highway commission.

The floating dredge—more commonly called the boat—is 120 ft. in length, including the ladder, and some 40 or 50 ft. wide. The hull is of wood and is 6 ft. deeper on the bow than astern in order that it will ride level when set in the water with the ladder weighing 25 tons attached to the bow. The accompanying pictures show the exterior of the boat from the front, side and rear. In the front picture, the ladder is submerged as when in operation. The huge A framed derrick which is used to either raise or lower the ladder is shown in position. Also note the lights used during the night work. The side view shows the spud well aft and the operating room forward and above the engine room. At the extreme right can be seen the discharge end of the ladder which is above water. The rear view shows one of the spuds elevated, the marine cable to left which brings the power to the boat, and the 12-in. manganese steel pontoon line to the right and through which the gravel and water is pumped.

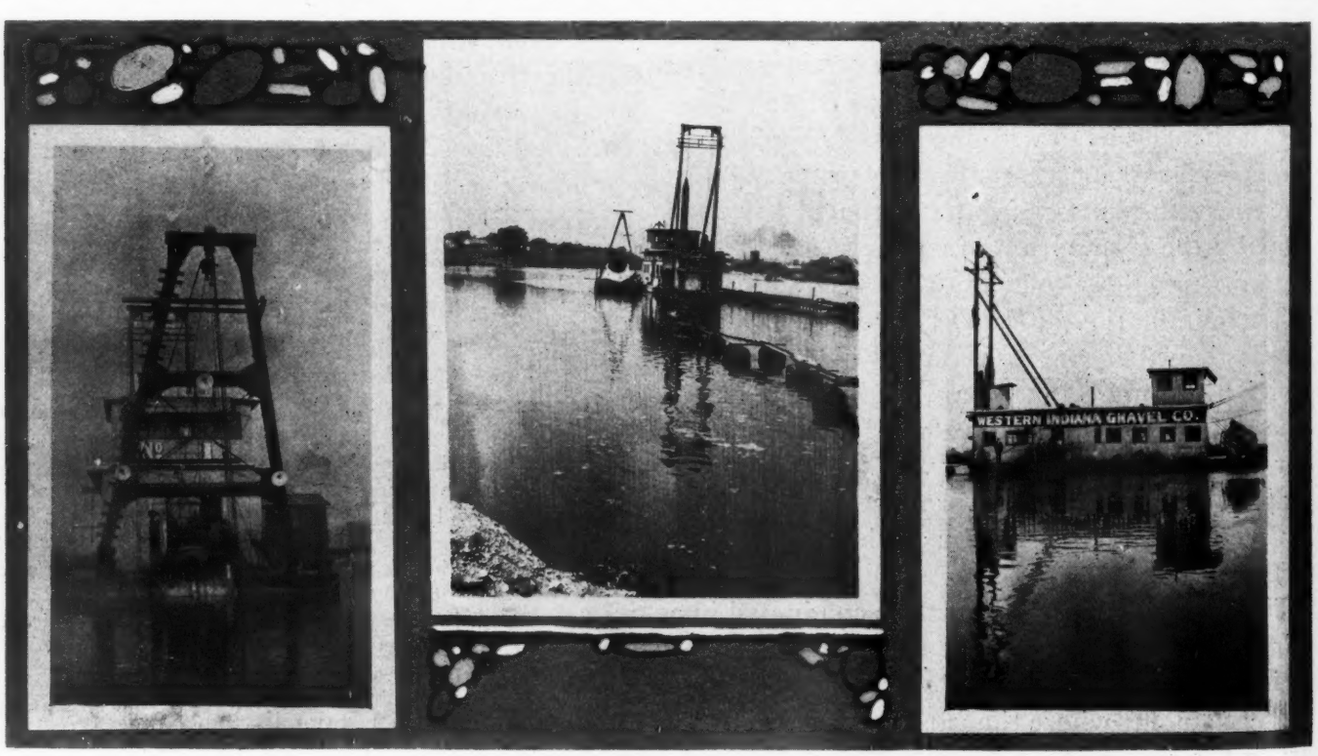
The plant is supplied with electricity at 33,000 volts, which is stepped down by three transformers to 2,200 volts. This furnishes power to a 250 H. P. motor used on the pump, 75 H. P. motor on the cutter and a 35 H. P. motor to operate the winch.

Operation

In order to clearly explain the operation of the boat the gravel will be followed in its chronological order from cutter to screening tower. On the bow of the boat and extending down to a depth of 40 ft. is a 72 ft. structural steel ladder. The ladder—which is merely a steel frame—performs two functions. It supports the cutter and cutter shaft and the 12-in. suction line from the pump. The cutter, which is of the screen type, is at the end of the ladder and is operated by a 6-in. shaft. When the plant was first put into operation an open cutter was used, but it was found that very frequently the large rocks would be torn loose and sucked into the mouth of the suction pipe. This would clog the pipe and stop the operation, for if they did get up the pipe, they were lodged in the pump and frequent stops were necessary. With the present cutter, pieces larger than 8 ins. are not admitted and the operation goes on continually. The cutter is operated from the operating room by a direct connected variable speed motor. At one time when the cutter was temporarily incapacitated, the plant tried to operate for a short time without a cutter, but it was impossible to keep the channel down to depth.

Centrifugal Pump

The gravel and water are sucked up the line to a 12-in. direct connected



Left—Front view showing the A frame to support ladder which is submerged. Center—Rear view showing left spud up, the 12-in. pontoon line to light and marine cable to right. Right—Side view, operating room on top and to right

Screen cutter showing screen feature, 6-in. drive shaft. 12-in. suction pipe up through lower frame takes suction inside hood

centrifugal pump. A 250 H. P. motor is used to operate this pump and force the gravel thru 650 ft. of pontoon line and up 35 ft. to the top of the screening tower. The pump casing has been a rather complex problem. At first, carbon steel casings were used, later high carbon steel casings, and now manganese steel casings are used and owing to the extreme sharpness of the gravel, the operators say three casings are used per operating season. The suction and discharge line are also of 12-in. pipe manganese steel, 45 lbs. per ft.

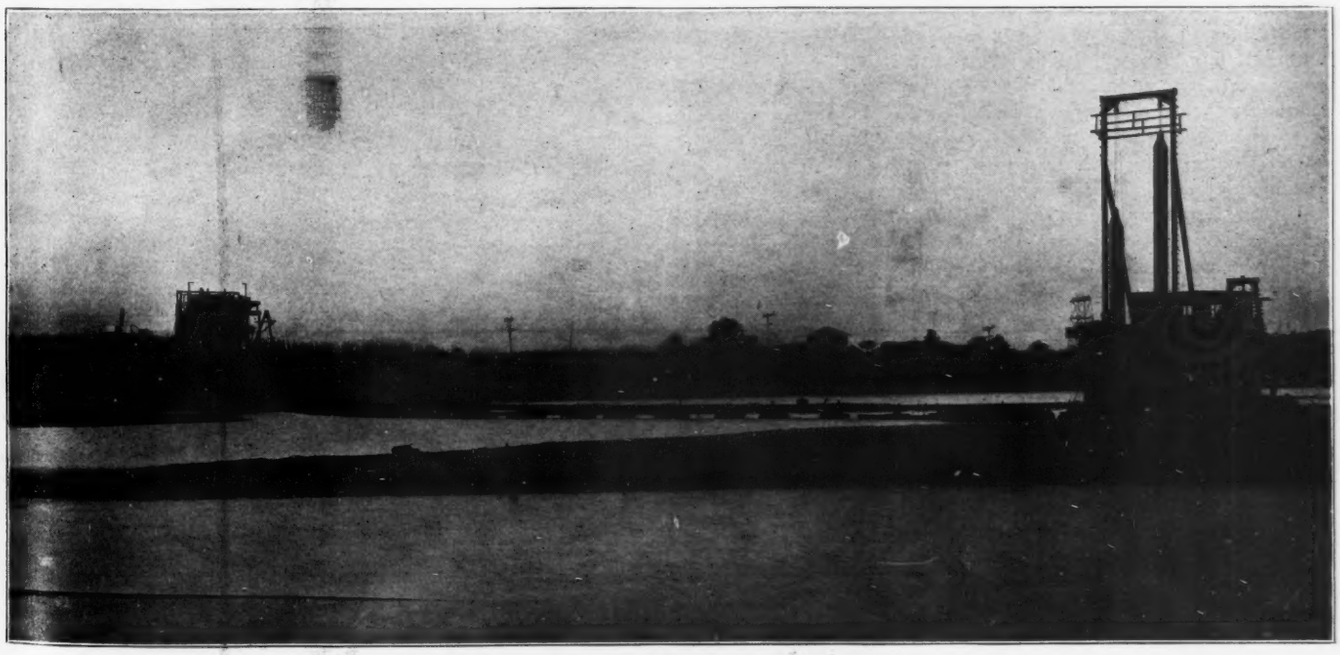
The boat is held in its course and the cut is made in the following manner: At the stern of the boat are two spud wells and two 56 ft. wood spuds. These may be seen from the rear view. The spud well is, as the name implies, a well which extends down to the bottom of the channel, thru which the spuds slide. The spuds are long timbers 24 ins. square with a 1500-lb. steel point on the end. They may be raised or lowered by the winch and are used to control the motion of the boat, or to hold the stern of boat in its course. Two swinging lines—have one end fastened to the winch drum and slide through sheaves on the head of the ladder to dead men on either side of the channel. A dead man is a large piling. To move the cutter, one swinging line is tightened while the other is slacked off.

Spuds and Spud Wells

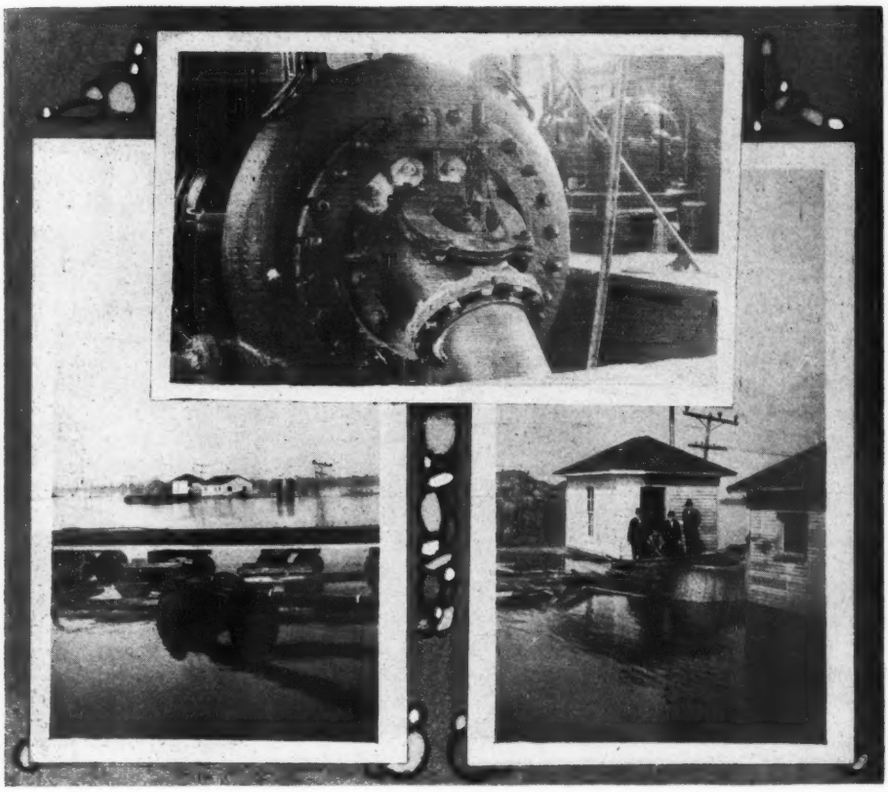
The boat moves up and down the pit making a channel of 250 ft. width and 40 ft. depth for each strip. This is done as follows: The cutter is kept at a constant depth of 40 ft. and is moved in a semi-circular cut with one of the spuds as a pivot and the length of the boat and ladder (125 ft.) as a radius. This is accomplished in this manner: While operating, there is never but one of the spuds down at a time. Let us say that the boat is swinging around to the right. In this event the right hand spud would be down and would be the pivot point; and the right swinging line would be taken in while the left swinging line is kept only tight enough to hold the cutter steady. When the boat has swung about till it is directly across the channel, the left spud is lowered and the right spud is raised; the right swinging line being slacked off and the left swinging line being used as the pulling line. The spuds are 12 ft. apart and it is found that this advances the cutter 4 ft. per swing, or the cut is 4 ft.

Operating Room

The operation of the boat is controlled from the operating room at the bow of the ship. An interior view is shown. The operator sits in front of the controllers in such a manner that he can see the gauge and switch boards. Directly in front of him is a large window through which he can also watch the operation or movement of the boat. The



View of plant taken at beginning of operations in 1916, showing boat to right, screening tower to left, pontoon line car storage and pit



Top—Manganese steel 12-in. centrifugal pump suction at center. Lower—Flood pictures during 1917

controls operate the pump motor, the cutter motor and the winch motor. The meters on the switch board are a volt meter and a meter from the pump. The other gauges are a vacuum gauge and a pressure gauge. By watching these gauges the operator can tell what per cent of solids is going thru the pump. The pump will pull 5500 g. p. m. and this should average 10 per cent solids. The operator uses the following method in determining the per cent of solids being pumped: He knows that when the pump is working at full capacity the flow of ampers thru the meter will be low but as soon as the load is taken off of the motor, the ammeter will read high. For normal full load in this case, the ammeter will read between 45 and 50, but for light load or when pumping only water, it will run up to 65 to 70. The vacuum gauge is attached to the suction side of the pump and as the per cent of solids increase the vacuum decreases—running down to 25 to 28 in. for full load and up to 15 in. when only water is being pumped. As the gravel passes the screening tower the pressure increases. At present the gauge reads 35 lbs. for full load and 25 lbs. when water alone is pumped.

Steady Full Capacity

The efficiency of the plant is highest when the pump is just handling its full capacity—or about 10 per cent solids. If the solids number less than this the plant capacity will be reduced, or if the per cent of solids is increased over this the pump will slow down, again decreasing the output. To get the maximum output the pump must be kept at steady full capacity.

The operator watches the gauges and when they begin to fall off he starts the cutter and when they have again builded up he stops the cutter. After all the gravel from one spot has been removed he starts the winch and moves over a foot or so to a new place. One man operates the dredge and another keeps the motors in running condition.

The gravel is pumped to a hopper on the screening tower and then on flat stationary screens 6 ft. wide and 15 ft. long. There are four of these—one below the other; each having a fall of 7½ in. per ft. Various materials from engine sand on up are made and deposited directly into cars—arrangements being provided for the loading of three at one time. At present the plant is operating on two 10-hr. shifts, but will soon change to three 8-hr. shifts. The present capacity is 80 cars per day. Up to date, 830,100 cu. yds. of gravel has been removed and 2,504,700 cu. yds. remain.

The plant has a storage for 200 loaded cars and is on the Terre Haute switching district, so that it can deliver over any one of four roads. The Big Four takes the cars to their yard where they are distributed.

This is one of the largest of the Greenville Gravel Co.'s plants. The Greenville Gravel Co.'s offices are at Greenville, Ohio, and the officers are as follows: P. D. Coppock, President, General Manager; H. R. Brown, Vice President, Secretary; C. E. Patty, Treasurer, Assistant General Manager; B. Hoel, Sales Manager and Guy C. Baker, General Counsel.

Combination Sanding and Coaling Station Saves Time

THE ILLINOIS CENTRAL RAILROAD is saving time in Memphis by the use of a combination two-track coaling and sanding station. The plant has a hoisting capacity of 75 tons per hour and can handle an engine very quickly.

Operating room controls to left, showing gauges and meters used for operating

Nature, Origin and Properties of Sand

Second Article—Classification of Sand—Physical Properties

THE ORIGIN OF SAND was discussed at length in ROCK PRODUCTS of August 2. The following paragraphs discuss the various methods of classifying sands and the properties of sand. Like the previous article this is based on "The Sand and Gravel Resources of Missouri," by C. L. Dake, of the Missouri Bureau of Geology and Mines.

Classification of Sand

Sands may be classified on several different bases. Among those most commonly used are origin, chemical content, mineral content, geographic distribution, stratigraphic distribution, size and use.

CLASSIFICATION BY ORIGIN—On the basis of origin, sands may be classified as eolian, river, glacial, lake, or seashore deposits, according as they have been formed by wind, by river erosion, by glacial abrasion, in lakes, or along the beaches of the ocean. Volcanic sand, more properly known as tuff or volcanic ash, is the fine particles ejected from volcanoes. Coral sand is finely ground fragments of corals and shells.

CLASSIFICATION BY CHEMICAL CONTENT—Classified on the basis of chemical content, sands are ferruginous, calcarous, argillaceous, and silicious, according as they contain iron, calcium carbonate, clay, or silica in excess of the quantity found in average sand. Sands with sufficient iron to give an unusual reddish, yellowish, or brownish color are said to be ferruginous, although some sands which appear to be strongly ferruginous and which show a deep reddish color, contain as low as one-half of one per cent of ferric oxide. In such sands the iron is only a very thin coating over the grains; but where sands have a ferruginous cement, the iron content is likely to run higher.

Sands containing only 3 per cent of calcium carbonate, that is, enough to result in marked effervescence, are called calcareous, though the calcareous sands of the Bermudas consist almost wholly of calcium carbonate, the result of the ceaseless grinding by the waves of vast quantities of marine shells and corals along the shore. This sand is also frequently known as eolian limestone or coral sand.

Sand which contains an appreciable but indefinite amount of clay is argillaceous sand, which, by increase in the ratio of clay to sand, becomes an arenaceous or silicious clay or shale. The terms silicious sand and silica sand are usually applied only to those sands with an exceptionally high silica content. There is no unanimity of opinion regarding the usage of the term, but it is more often than not restricted to sands ranging from 96 per cent to 100 per cent pure silica. Most of the river and glacial sands are moderately argillaceous.

CLASSIFICATION BY MINERALOGICAL CONTENT—On the basis of mineral content, sand may be named either from the dominant mineral present, or from the unusual occurrence of some particular mineral, even though the actual quantity of that mineral may be very small. Quartz sand, though other minerals may be present in small amounts, consists essentially of quartz. Feldspathic sand, or arkose sand, may be largely quartz, with appreciable quantities of unweathered feldspars, or it may consist almost wholly of feldspar, depending on the nature of the rock from which it has been derived. Micaceous sand is so called from the presence, usually in only small quantities, of flakes of mica.

Magnetite sand, or magnetitic sand as it is sometimes called, may be any type of sand with an appreciable amount of magnetite (magnetic iron ore). Such sands are frequently known as "black sands," and though usually carrying only a little magnetite, they may in rare cases be almost pure magnetite. Any sand with considerable quantities of unweathered ferromagnesian minerals is known as a ferromagnesian sand. Such sands usually result from mechanical disintegration of basic igneous rocks.

Sands carrying the mineral glauconite, a complex greenish silicate of iron and potash, and common on the Atlantic Coastal Plain, are known as glauconite sands, or more commonly as "green sands," from the greenish color imparted by the glauconite grains which may make up as high as 75 per cent or more of the mass. These sands, on account of the potash and phosphoric acid they contain, are used as fertilizer. Monazite sands, carrying the valuable rare-earth phosphate, monazite, result from the weathering of monazite-bearing igneous rocks. Auriferous sands and gravels are those carrying placer gold.

CLASSIFICATION BY GEOGRAPHIC DISTRIBUTION—On a geographic basis, sands or gravels are often named from the locality from which they come. Thus we speak of Mississippi River sands, Ohio River sands, Cow Bay sands, and others. To sand dealers and consumers such names have a considerable trade significance, because they stand for certain definite qualities characteristic of sands or gravels from these localities.

CLASSIFICATION BY STRATIGRAPHIC DISTRIBUTION—Sands are not infrequently named from the formation or geologic age in which they occur, as, for example, St. Peter sand, Tertiary gravel, Quaternary sands and gravels, Pleistocene sands and gravels, Aftonian gravels, Recent sands and gravels. Like locality names, stratigraphic names may have a commercial value.

CLASSIFICATION BY SIZES—Civil engineers, architects, and builders are particularly interested in size of grain, and tend to classify sands according to size.

CLASSIFICATION BY USES—According to use, sands and gravels are given a variety of names, such as concrete gravel, roofing gravel, plastering sand, paving sand, glass sand, moulding sand, core sand, filter sand, furnace sand, stone sawer's sand; terms which explain themselves. A detailed description of these will be taken up further on in a discussion of the uses of sand.

Properties of Sand

Upon the physical and chemical properties of sands, depends their suitability for the various uses to which they may be put. For some uses the physical properties are controlling factors, for others the chemical composition is the most important.

COLOR—For most uses color itself is a negligible factor and needs to be taken into consideration only in a few special uses. Iron, one of the commonest impurities, is usually present as a coating on the individual grains, and even in very small amounts gives to the sand various shades of red, yellow, or brown, grading in some cases almost to black. The presence of clay or shale gives colors varying from gray to pale green. A number of dark colored minerals (tourmaline, garnet, pyroxenes, amphiboles, magnetite, etc.) give grayish, mottled colors, ranging to black in the so-called "black sands."

In sandstones the commonest discoloration is reddish, yellowish, or brownish iron stain, or gray-green clayey bands. The purer quartz sands vary from very light gray to an almost dazz-

ling white. In the manufacture of certain light-colored terra cotta and for use in cement or mortar where great whiteness is desired, pure white sands are demanded. In the manufacture of high grade glass also only the whitest sands are used, though colored sands are sometimes employed in the cheaper grades. Color is considered in selecting sands largely because it is an indication of impurities.

CLEANNESS—A much more important property of sand than color is cleanness, a term used rather loosely to indicate purity. Technically, cleanness is determined by washing. A given amount of sand after being completely dried and weighed is placed in a pan of water and thoroughly stirred. It is then allowed to settle a given length of time, after which the water is poured off. This process is repeated as often as is necessary to wash the sand clean, that is, until the water when stirred ceases to show any turbidity. The washed sand is then dried and again weighed. The loss of weight, which is found by subtracting the weight after washing from the weight before washing, represents the removed impurities; and this difference divided by the original weight (before washing) gives the proportion of impurity in the unwashed sand. This is expressed in the formula:

$$D = \frac{W - W'}{W}, \text{ in which}$$

D = the proportion of dirt,
W = the weight before washing, and
W' = the weight after washing.

Of course, the sand must be thoroughly dried when weighed, as moisture would increase the weight. In order to make this figure for "D" of greatest value in comparing sands, it is necessary to know the length of time the sand was allowed to settle in the water, for this will control the amount and coarseness of the material removed. This length of time should always be stated in giving percentage dirt. In pouring off the turbid water, care must be exercised not to pour off sand grains, as this would increase the amount of apparent impurities. It is usually best to evaporate the last portion of water rather than to try to pour off too closely.

From a study of this method of cleaning sand, it will be seen that the chief impurity eliminated is clay or silt, together with a little woody or organic matter and a little finely divided quartz. Some iron stain is also removed. In most glass sands the percentage of dirt is so low as to be almost inappreciable by this method, though producers find it desirable to wash their melting-sands. In this way they remove a slight clay sediment and a portion of the iron, together with much very fine quartz sand which is undesirable in the batch. Many gravels are washed to remove the clay, but this washing is done by rapid currents of water which remove fine sand as well.

A simpler method than that just outlined to detect impurities in the sand is to rub a little of it between the hands. A quartz sand that is perfectly clean will not soil the fingers. If a sand is found to be dirty, an examination should be made of the character of the dirt. Clay in moderate quantities (ten to thirty per cent of the sand) is said not to materially weaken cement mortars.

Calcareous marl is usually not particularly harmful in cement work, but peaty matter, humus, or badly decayed rock particles, particularly those that flake into thin scales, are very detrimental as they materially decrease or even destroy the strength of mortar. Peaty or lignitic matter swells, due either to heat or to moisture, and causes the surface of walls or sidewalks to pop open, leaving pits Builders claim, however, that the lignite does not seem to be harmful in heavy walls or foundations. On the other hand vegetable matter present in the form of humus, coating the grains of sand and preventing the proper adhesion of the cement, may possibly be harmful when present in quantities as small as ½ per cent of the weight of the sand, and are certainly harmful when abundant. Of course, the surface of the individual grains of sand or gravel should be free from any other coating, clay, for example, which would prevent proper adhesion of the cement to the rock particles.

SIZE OF GRAIN—Size of grain is of considerable importance in determining the value of a sand for certain purposes. This sizing is usually determined by screen tests.

According to the Bureau of Standards, practically all the sand for plaster work should pass a 20 or 30-mesh, for mortar a 10-mesh, and for fine concrete aggregate, a ¼-inch mesh.

Uniformity Coefficient

This is a term used to designate the amount of variation in size of sand grains. It is defined as the "ratio of the size of grain which has 60 per cent of the sample finer than itself to the size which has 10 per cent finer than itself."

That is, in a sand, if just 10 per cent were finer than 1 mm. and just 60 per cent finer than 2 mm., the uniformity coefficient would be 2. In other words, 50 per cent of the sample lies between 1 mm. and 2 mm. in diameter. Similarly, if 10 per cent of the sample were finer than 3 mm. and 60 per cent finer than 6 mm., the uniformity coefficient would again be 2, though the latter sand would be three times as coarse as the former.

Thus, it will be seen that the uniformity coefficient does not necessarily indicate the absolute coarseness or fineness of a sand. It merely expresses a ratio of variation of size of grain. A sand with a coefficient of 5 means that 50 per cent of that sand has a variation in size of grain represented by the ratio of 1:5. A uniformity coefficient of 1, which is almost an impossibility, would mean that 50 per cent of the sand was uniform in size, with 10 per cent smaller and 40 per cent larger than this size. The smaller the uniformity coefficient, the more uniform the grain of the sand; the larger the uniformity coefficient, the less uniform the grain of the sand.

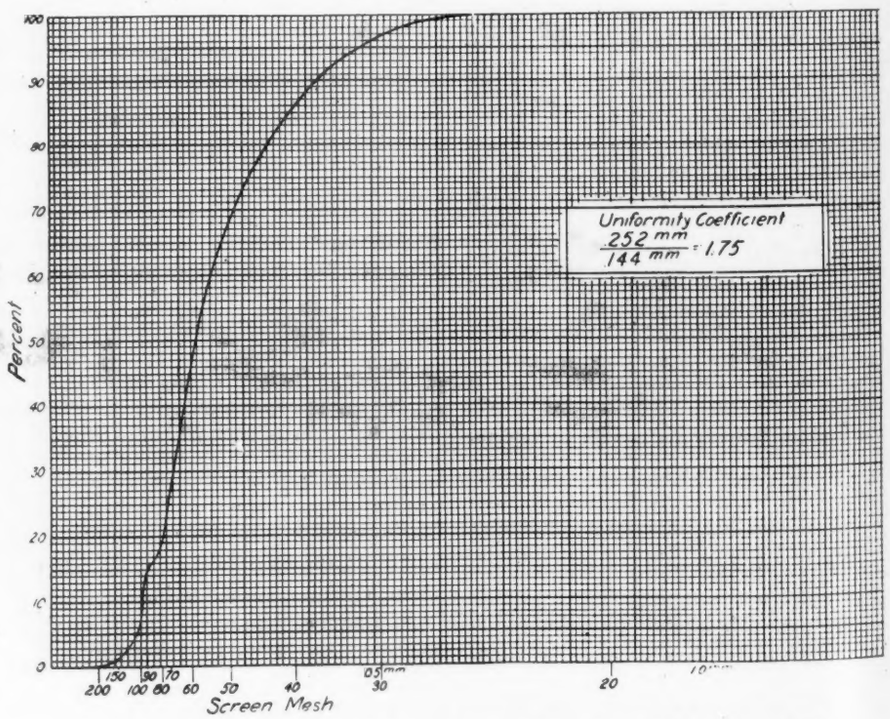


Diagram showing screen analysis for a uniformity coefficient of 1.75

Through.	On.	Per cent.	Mesh.	Opening.	Total thru.	Total on.
—.....	10	——	10	——	100.00	0.00
10.....	20	——	20	.864mm	100.00	0.00
20.....	30	3.71	30	.503	96.29	3.71
30.....	40	10.39	40	.381	85.90	14.10
40.....	50	17.42	50	.279	68.48	31.52
50.....	60	24.11	60	.221	44.37	55.63
60.....	70	14.72	70	.185	29.65	70.35
70.....	80	10.39	80	.173	19.26	80.74
80.....	90	4.22	90	.150	15.04	84.96
90.....	100	8.68	100	.140	6.35	93.65
100.....	150	5.66	150	.104	0.69	99.31
150.....	200	0.31	200	.074	0.38	99.62
200.....	Pan	0.38	Pan	——	0.00	100.00

Inasmuch, as the variation in size of sand grains is itself not a uniform one, the drawing of a smooth curve through the points of the plot introduces error, which is decreased, however, in proportion to the number of points actually located on the curve. That is, the larger the number of screens used in making the test, the more accurate will be the figure for the coefficient of uniformity.

Uniformity coefficient is a term much used in describing filter sands. For most other uses to which sand is put the figure is not usually considered. Generally speaking, sands with a low coefficient of uniformity are desirable for filter purposes and those with a high coefficient, for concrete work.

(To be continued)

One Hundred Tons of Trap for 3 Tons of Dynamite

THE ACCOMPANYING view shows the result of a blast made July 28 at the quarry of the Delaware River Quarry & Construction Co., Moore, N. J.

The length of the pile of loose rock brought down is 400 ft., the height in the center is 175 ft., and the estimated contents is 100,000 tons.

Three tons of 40 per cent dynamite were used in three well-drill holes.

This company manufactures Belgian paving blocks and crushed stone. The general offices are in Lambertville, N. J. The president of the company is R. A. Montgomery, to whom ROCK PRODUCTS is indebted for the view and data given.

Needs of French Rock Products Industry

A FRENCH CEMENT MANUFACTURER gives a clear view of the rock products industry of his country in the following letter to ROCK PRODUCTS:

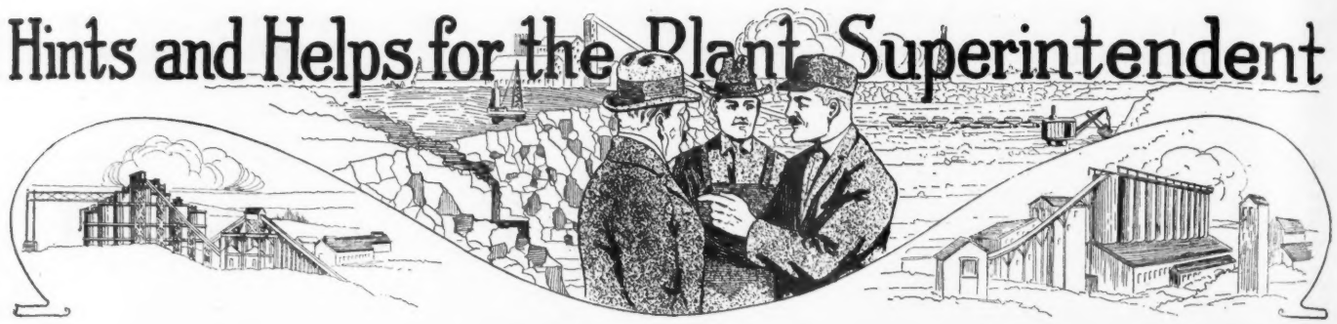
"The French industries are lacking two things: First, coal; second, labor. We want to get coal anywhere, preferably in Pennsylvania. Our production was reduced 50 per cent through the Huns destroying our best coal fields in northern France (20,000,000 tons out of a total of 40,000,000 tons per annum).

"We have lost 2,000,000 men through the war—1,500,000 dead and 500,000 permanently disabled—and so want badly all kinds of conveying, elevating and other kinds of labor-saving machinery. We want to get it where it can be found—America, Great Britain or even Germany—but are badly hampered through the very unfavorable rate of exchange with the United States.

"One dollar is worth 7 francs instead of 5 francs 35 cm. as before the war. We will get a much better rate from Germany. (Such is unluckily the actual state of affairs, that we will get better conditions from these fiends than from our best friends.)"

Results of a 3-ton dynamite blast in New Jersey trap-rock quarry

Hints and Helps for the Plant Superintendent



Quarry Drainage

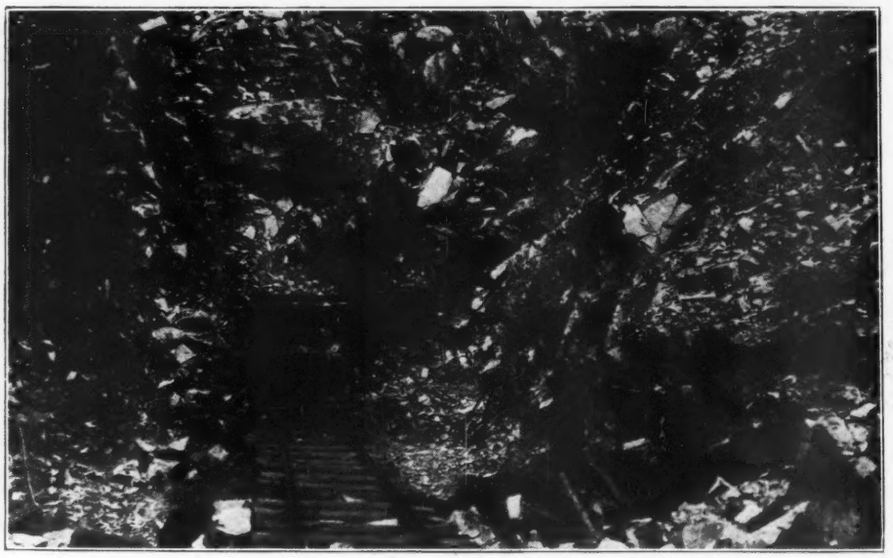
THE DRAINAGE OF PIT QUARRIES is an engineering problem which often requires considerable foresight for the most economical solution. In a deposit of rock to be opened up drainage should of course be considered before the plan of operations is decided upon. Self-drainage is often possible by adopting a proper plan at the start.

Excessive pumping is to be avoided where possible, not only on account of the extra expense, but because of the inconvenience involved should the pumps be out of commission for any length of time.

Many quarries which do not require much pumping during the working season do require pumping out after the winter snows.

Of pumps there are a great variety. The selection of a pump is determined by the capacity required, the power to be used and its location in the quarry.

Outlet of drainage tunnel, Charles Warner Co. quarry, Cedar Hollow, Penn.



Inlet of drainage tunnel at right of car

But pumps are by no means the only means of draining a pit quarry. The accompanying views show a method used at the Cedar Hollow quarry of the Charles Warner Co. in Pennsylvania. Pumps here have been replaced by a tunnel, about 5 ft. square, which was driven into the quarry from older workings at a lower level. This tunnel is several hundred feet long and most of it is driven through limestone.

The first cost of such a tunnel is of course quite an item, but a dry quarry floor at all times of the year is likewise a considerable advantage. In this case the interest on the money invested in the tunnel is less than the sum of the interest on money invested in pumping equipment and the operating and depreciation charges on it.

Many pit quarries are so located as to make it impossible to find lower ground to drain to. A Buffalo quarry man, James Savage of the Buffalo Crushed Stone Co., has found a way to drain such a quarry without pumping.

From openings in the same vicinity he had reason to believe that under the impervious shale floor of the quarry was a more open formation. By drilling a 6-in. hole about 90 ft. into the bottom of the quarry he struck into this open formation. The explosion of a few quarts of nitroglycerin in the bottom of this hole opened up the surrounding rock so that the quarry is drained completely through the 6-in. hole.

These two solutions of the quarry drainage problem show that there is more engineering to a quarry operation than is sometimes considered.

To Tax Sand and Gravel in the State of Texas

IN THE SENATE at Austin, Texas, final passage was accorded Senator Gibson's bill authorizing the state to collect tax on sand and gravel taken from public fresh waters of the state, the same as is collected on sand and mud shell obtained from tidal waters. Sand and gravel used for public purposes are exempt.

Rope Driven Spreading Hopper for Loading Gravel

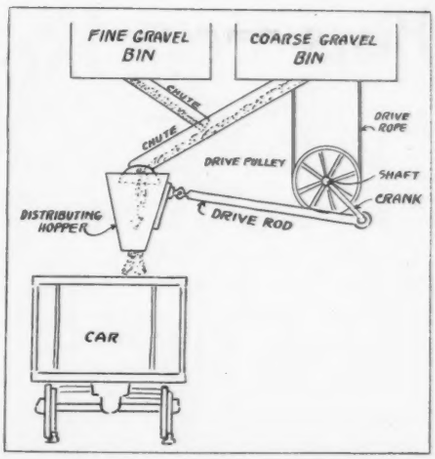
THE SUMMIT SAND & GRAVEL CO., at Terre Haute, Ind., has installed on its plant a very unique and satisfactory device for mixing and spreading gravel across the width of the car. The accompanying sketch shows the arrangement of the gravel bins, the chutes leading from the gravel bins, the spreading hopper and also, roughly, how the hopper is operated.

The distributing hopper is suspended from the end of the gravel chute—being pivoted at the top and center so that a longitudinal thrust from the drive rod will cause it to swing in the arc of a circle. A chute from the fine gravel bin is so arranged as to empty into the coarse gravel chute at a point above the hopper. This arrangement will allow the same spreading device to be used for the loading of coarse material, fine material, or it allows the production of "plant-mixed material"—that is, a gravel with any fixed per cent of coarse and fine material may be produced by varying the amount of gravel from one or the other chute.

The gravel spreading hopper at the end of this chute, receives its motion by rope drive, from a counter shaft connected to a small gas engine used to operate the screens, on the screening tower. The rope drive gives the drive wheel at the end of the shaft a rotary motion which is transmitted along the shaft to the crank. The rotary motion of the crank is propagated by the drive rod to the hopper, giving it a reciprocating motion. This reciprocating motion causes the mouth of the hopper to swing back and forth across the width of the car depositing gravel first on one side and then on the other. The operation of the spreading device is very similar to the crank motion of a small steam engine when the power is applied to the fly wheel (as the driving wheel in this case). The shaft, crank and driving rod all perform the same function as those parts of the steam engine.

The ratio of the pulley on the counter shaft of the engine on the screening tower, to the pulley on the spreading device shaft, is such as to reduce the speed to four revolutions per minute of the drive wheel. Since for each revolution of the drive wheel the hopper makes two trips across the width of the car, the hopper moves across the car in one-eighth of a minute. The crank throw is about 6 in., thus for one revolution it will move the drive rod back and forth about 12 in. The drive rod is connected to the hopper some 12 in. down from the top of the hopper, which is about 36 in. tall. Thus the mouth of the hopper will move through a distance of 3 ft. in a horizontal direction—which, in this case is sufficient to cause the gravel to be deposited evenly across the width of the car. Of course the travel of the hopper could be increased or decreased by either increasing or decreasing the throw of the crank, or the ratio of the lever arms at the hopper.

This device was constructed and designed by this company, of which George Nattkemper is president. It was found that when the gravel was allowed to fall from the chute into the car that it would pile in the center—all coarse material running out to the edge and leaving the fine material in a heap in the center. As operated here, the spreading device has prevented the pyramiding of the material and overcome the difficulty of the segregation of coarse and fine materials.



Spreading hopper for loading gravel

Nature of Some Common Accidents

THE DIAGRAM BELOW, based on the experience of members of the Portland Cement Association is worth a thorough study by every rock products operator. It is complete in itself and does not need explanation.

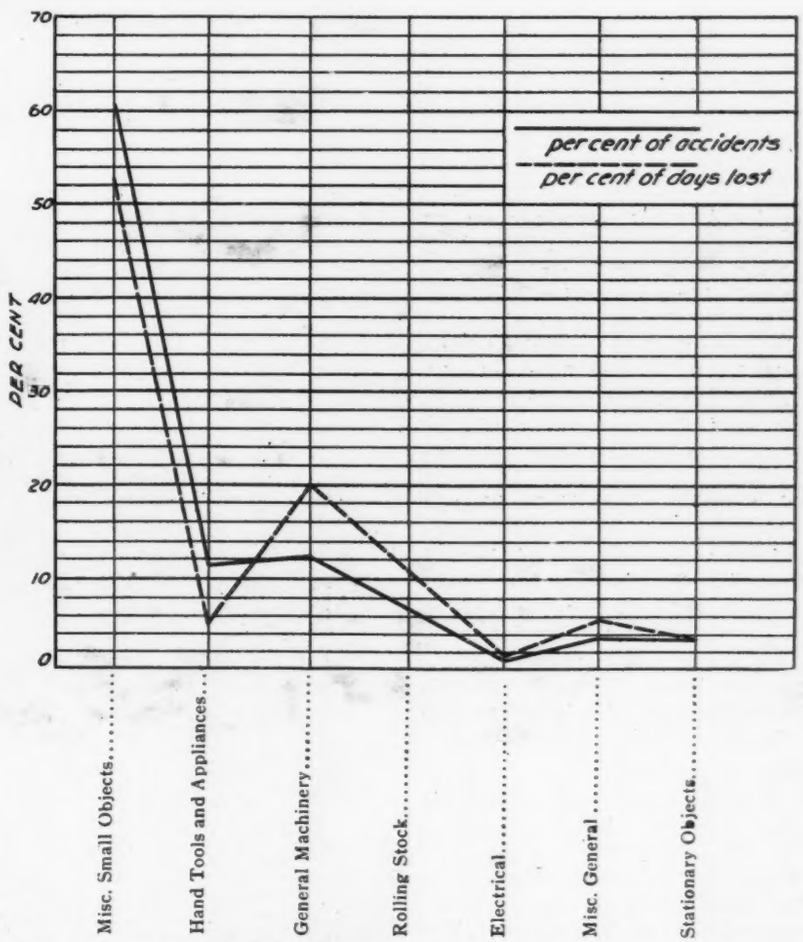


FIG. 2. PERCENTAGES OF ACCIDENTS AND DAYS LOST CAUSED BY VARIOUS EQUIPMENTS AND APPLIANCES.

12

The Trap Rock Company of Minneapolis Begins Operation With Big Blast

Dresser Junction Quarry the Scene of 40-Ton Dynamite Blast — 250,000 Cu. Yd.

AFTER TWO OR THREE NON-PRODUCTIVE SEASONS the Trap Rock Co., Minneapolis, Minn., has started operations on a large scale. Orders are already in sight for all the stone the plant can possibly turn out this season.

The quarry and crushing plant of this company are about 50 miles northeast of Minneapolis, at Dresser Jct., Wis. At this quarry on Sunday, August 3, was fired the largest dynamite blast ever attempted in the Northwest and one of the largest quarry blasts ever made in this country.

Six Gopher Holes

Preparations for the blast were made on the gopher-hole system or coyote-hole, as it is known in the far West. Six holes or tunnels were driven into the face of the ledge, as shown in the accompanying sketch. These averaged about 70 ft. long. The distances between the headings were as follows: Nos. 1 and 2, 70 ft.; Nos. 2 and 3, 100 ft., Nos. 3 and 5, 85 ft., Nos. 5 and 4, 90 ft.; Nos. 4 and 6, 70 ft.

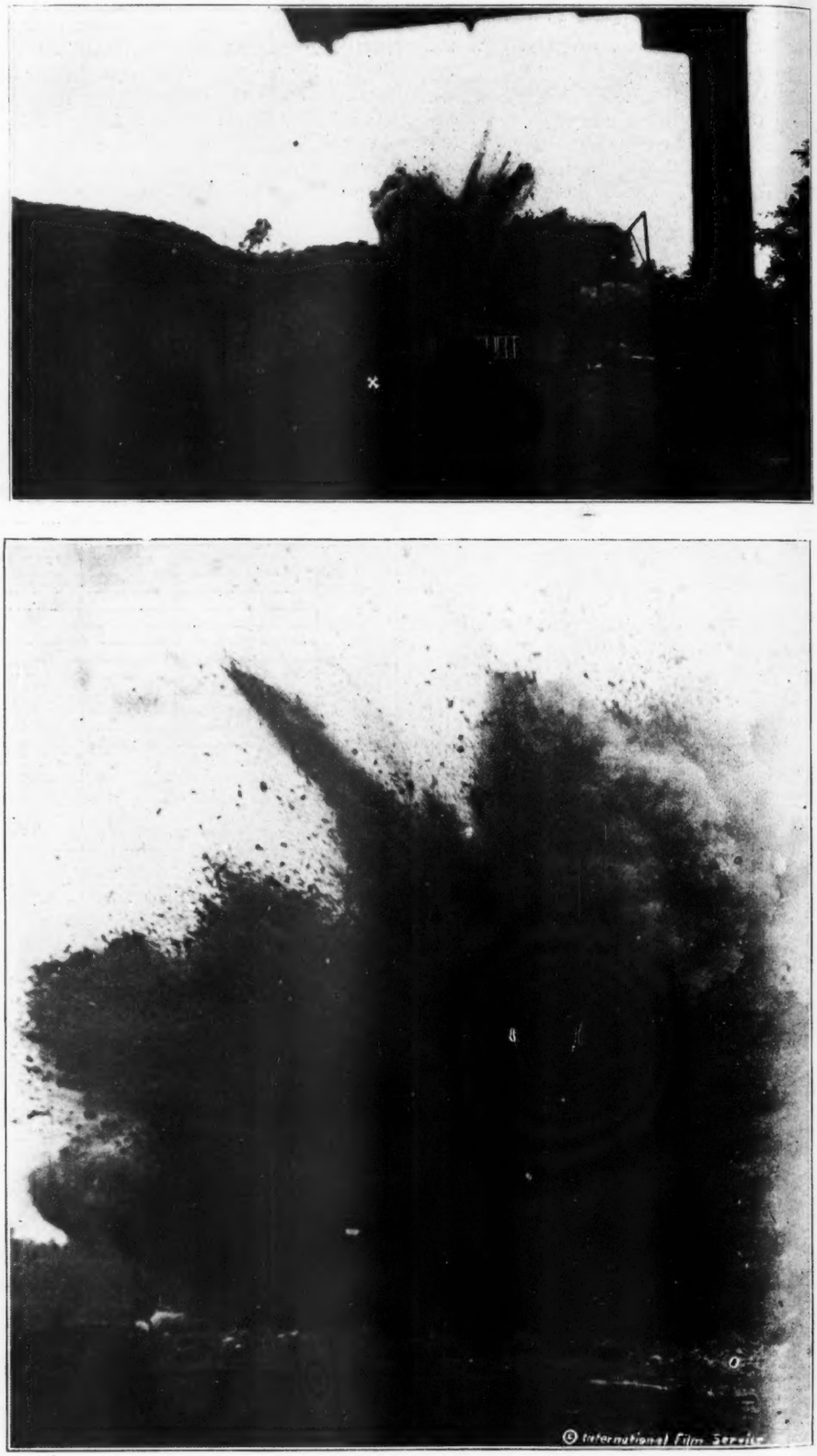
The headings or tunnels were no larger than necessary for the work of excavating them. In few places were the tunnels big enough for a man to stand upright. They were designed to be driven into the face approximately on a level with the quarry floor and with only slope enough for proper drainage, but no particular care was considered necessary to make the alignment accurate.

Each tunnel was provided with two cross-cuts, one about 40 ft. from the face of the ledge and the second 30 ft. beyond the first. The length of each cross-cut was from 20 to 25 ft. from the junction with the main tunnel, the interior cross-cuts being somewhat (about 10 ft.) longer than the outside ones. The ends of the cross-cuts were enlarged to provide storage room for the powder.

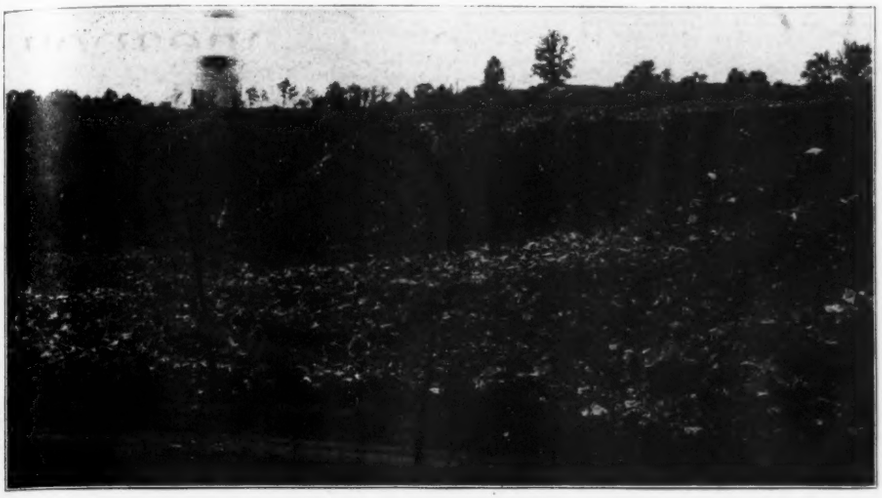
Loading the Pockets

The loading of each pocket in pounds of dynamite is shown in the accompanying sketch. The powder used was 35 and 40 per cent Aetna dynamite.

The dynamite was removed from the boxes and the sticks tightly packed. The remaining unfilled part of the cross-cut was then filled with packed screenings and dust. The intersections of the cross-cuts and the heading were filled with concrete. The headings between the cross-cuts and to the opening in the face



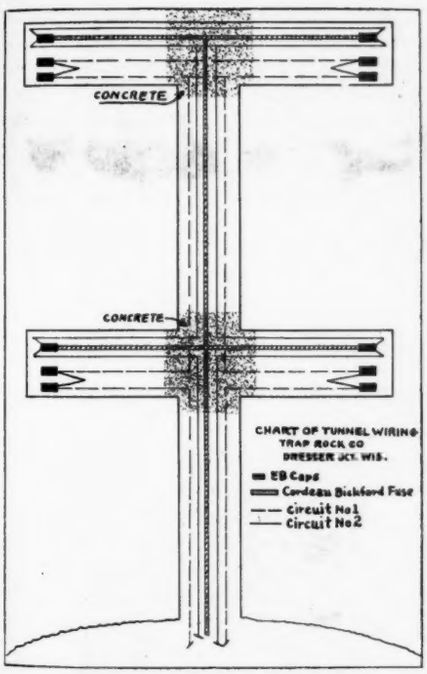
Two views of the explosion of 40 tons of dynamite



Results of the explosion of Nos. 4 and 6 tunnel charges

For exploding the blast two independent electric circuits were provided as shown in the accompanying sketch. Tied into the No. 2 circuit and using the same caps was a Cordeau-Bickford fuse. It was designed to use the No. 1 circuit, and in case of failure the No. 2. The Cordeau-Bickford fuse insured against failure of both circuits and made practically certain the explosion of the whole charge in case of failure of any part of the circuit. The six tunnels were connected in series to a hand-operated battery exploder.

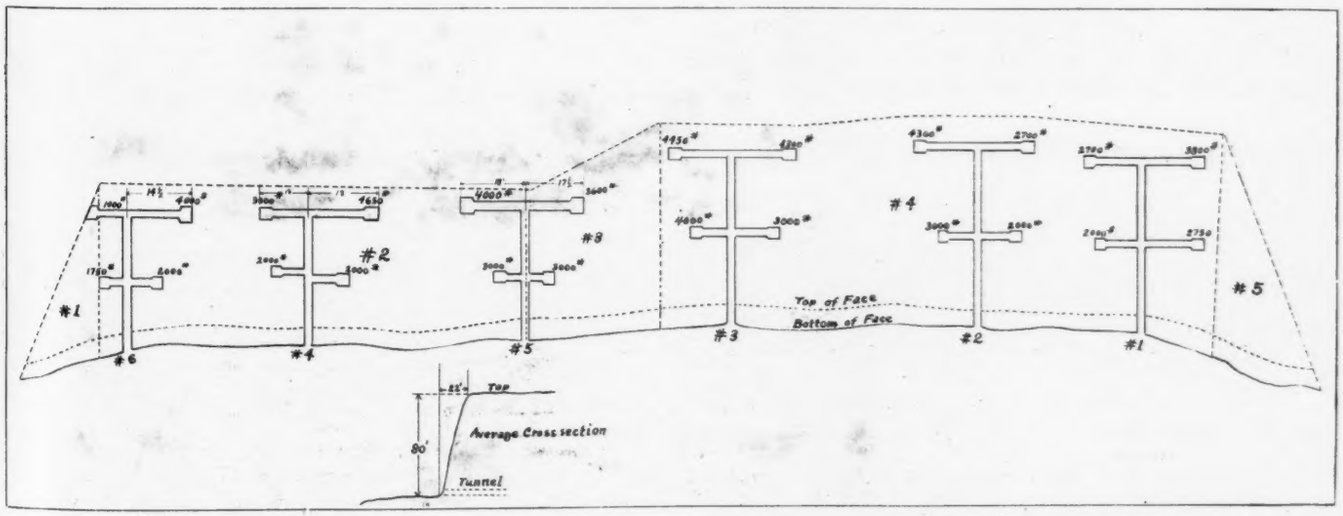
The wires were led out of the tunnels in conduits made of the boards from the dynamite boxes, which protected them from the moisture and the filling material. The ends of the wire circuits were carefully wrapped in tire tape after they had been completed. The circuits in each tunnel were not joined in series until the blast was to be made. Frequent electrical storms made it essential to provide every possible precaution against an accidental explosion.



View of rock brought down in first blast

of the ledge were filled with small stones laid up by hand, with the joints filled with screenings and dust.

The powder was in place for something over a week before the blast was shot, and many of the tunnels were wet.



Diagrams showing loading of tunnels and arrangement and location of tunnels and cross-cuts—Loading of each cross-cut pocket

Various headings in face of ledge, showing rock packing in tunnels

Each exploder cap was inserted in a stick of 60 per cent dynamite, and this stick was made the center of a bundle of similar sticks of 60 per cent dynamite.

The blast was staged for 8 o'clock in the morning. Before connecting up the different tunnel circuits, each circuit was of course tested. Everything was found O. K. In the meantime a severe rain and electrical storm came up and it was attempted to explode the blast during this storm.

Only the No. 6 tunnel, and apparently only the outside cross-cut was fired. The exact cause of the failure could not be determined, but was evidently due at least partly to the weather conditions and the contact of the wires with the wet ground, although the ordinary insulated copper wire was used. It may also have been caused by too weak a current in the battery.

After a thorough investigation it was found that the other circuits were all intact and a second attempt was made to fire the blast at 2 o'clock in the afternoon. This time the battery man moved to a position within 500 or 600 ft. of the No. 6 tunnel in order to shorten the circuit.

Here, from under an empty side-dump quarry car, he worked his battery a second time; and the result came near costing him his and his helper's lives. The entire charge went off this time and two stones of at least a cubic yard size missed the car shelter of the blasters by narrow margins.

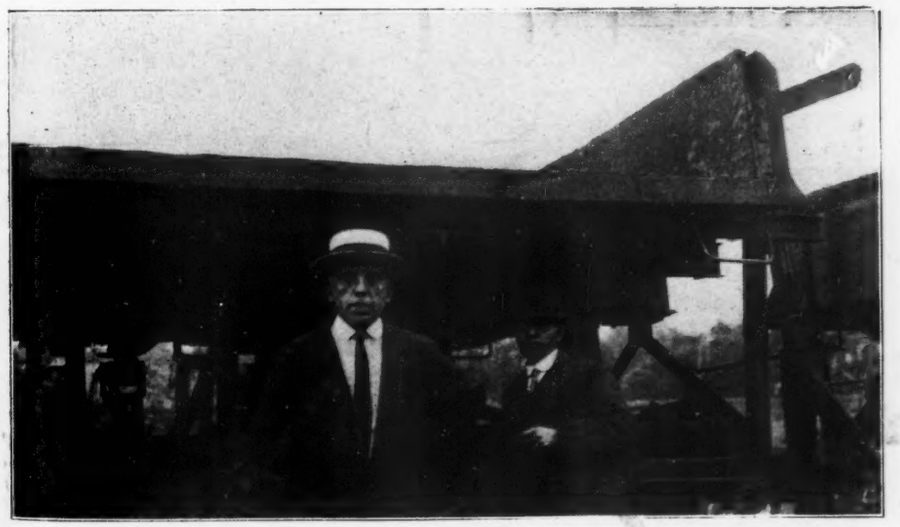
Spectators half as far again away from the quarry face were treated to a shower of trap rock, which none of them would care to experience again. Fortunately in spite of a considerable number of spectators, no one received injuries beyond slight cuts and bruises.

Ledge before and after 40-ton dynamite blast

View of highest part of ledge

The effect of the shot is shown to some degree in the accompanying views. The face of the quarry was broken back approximately 100 ft. and the ledge broken up into remarkably small pieces. The stone was thrown a good ways from the face of the cliff in several places, and it was subsequently decided that the charge in the outside cross-cuts had been larger than necessary. The charges in the outside cross-cuts, as shown in the accompanying plan, were from one-half to two-thirds of those in the interior cross-cuts. From the manner in which this rock broke up it is probable that one-third of the interior charge would have given more satisfactory results.

Same ledge after blast



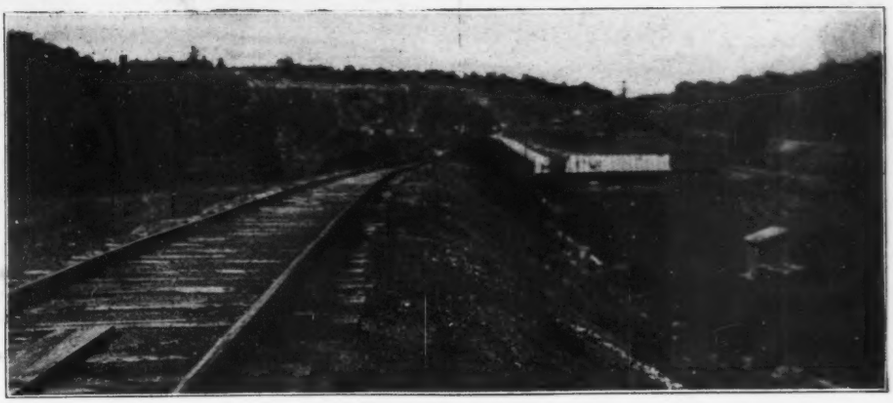
John Wunder examining the refuge of the blasters

However, it is estimated that at least 250,000 cu. yd. of stone were made available by this blast. The material is different from almost any found elsewhere and there was no previous experience to go by in gauging the charges.

The loading and blasting operations were under the general supervision of G. O. Schroder, representing the Aetna Explosives Co., Duluth, Minn., office. Mr. Schroder spent over a month at the quarry and labored ceaselessly for the safe and successful outcome of the blast, and it is greatly to his credit that not a man was injured during the whole time of preparing and loading the tunnels.

The general manager of the Trap Rock Co. and master of ceremonies on August 3 is John Wunder, who is well-known to the entire crushed stone and sand and gravel fraternities. The man to have the honor of exploding the charge, and the good fortune to escape alive, was Harvey Wunder, a son of John Wunder. Harvey Wunder is a returned officer from the A. E. F., which may account for his daring.

Visitors and witnesses of the blast were B. O. Pickard of the United States Bureau of Mines; John T. F. Oxall, Electric Furnace Products Co., Sauda Ryfylke, Norway; I. Appleton and G. L. Lardie, of the Union Carbide Co., Sault Ste. Marie, Mich.; a moving picture representative of the Hearst-Pathe International News Service, the editor of Rock Products and about 99 per cent of the population of Dresser Jct.—more or less.



The quarry from the crushing plant

Tennessee Rock Phosphate

THE ROCK PHOSPHATE INDUSTRY of Tennessee is developing into an operation in many respects parallel to the agricultural limestone industry of the Central West. Great strides have been made in the promotion of ground rock phosphate, notwithstanding the opposition of the manufacturers of acid phosphate.

There are many independent producers of rock phosphate whose only market hitherto has been that offered by acid phosphate manufacturers, who in the main are the same as the meat packers or "beef barons." Their methods of buying livestock are pretty generally known, and it is sufficient to say that their method of buying phosphate from independent producers is not much different.

The production of ground phosphate rock is exactly similar to the production of agricultural limestone. The material is first dried, then crushed and ground. Mining is popular, although the overburden in many cases is no more than is removed in many limestone quarries.

The views shown herewith are those of a typical new plant in the Mount Pleasant section. This is the plant of the Consolidated Phosphate Co., with offices at Columbia, Tenn.

The amount and character of the overburden is shown in the first view. Large scale production by open-pit quarrying would probably make it possible to produce ground rock phosphate from such a deposit for about the same cost that ground limestone is produced in Ohio in similar operations. Limestone sells for around $3 a ton, phosphate for around $10.

Sample of Tennessee phosphate rock—Note mixture of blue and brown rock

Upper—Ledge of phosphate rock uncovered around hill. Center—Entrance to mine. Bottom—Crushing, pulverizing and loading plant of Consolidated Phosphate Co.

The Uses of Lime in Ore Dressing and Metallurgy

Extensive But Little Known Outlet for Lime and Limestone—Function of Lime and Limiting Impurities

By Paul T. Bruhl
Mill Superintendent, American Venture and Mines Corporation, Thomson, Ga.

LIME, IN ONE OR ANOTHER OF ITS FORMS, finds an extended use in ore dressing and metallurgy. Its relative cheapness, its widespread distribution as limestone and dolomite, and its effectiveness in the processes wherein it is employed constitute it one of the important reagents at the metallurgist's command.

Lime possesses the property of combining with water (slaking) to form the hydroxide. $CaO + H_2O = CaO.H_2O$ or $Ca(OH)_2$. The action is strongly exothermic, that is to say, there is considerable evolution of heat. Water containing undissolved slaked lime in suspension is called milk-of-lime, whilst the clear liquid is known as lime-water.

If lime is left exposed to the air it becomes air-slaked or converted, in part, by the carbon dioxide of the atmosphere to the carbonate, in which form its efficiency as a settling agent is much impaired. The mill superintendent should be careful then, if he does not wish to increase the treatment costs unnecessarily, to store his lime in a closed waterproof shelter. Blame is not unfrequently laid on the lime when it should be laid principally on careless storage.

Gold and Silver Ores

In the cyanide treatment of gold and silver ores lime has long held an important place. It counteracts any acidity in the ore, thereby obviating the consumption of the more expensive sodium or potassium cyanide, and causes a readier settlement of the slimes, a much desired effect in the slimes process.

Some ores, containing pyrite, may have a strongly acid reaction due to the formation of sulphuric acid as a result of the oxidation of some of the sulphur. It is essential that the cyanide solution be kept alkaline by the addition of an adequate quantity of lime. This neutralizes the acid and precipitates the SO_4 radical as insoluble calcium sulphate. If not enough lime is added the soluble bisulphate of calcium may be formed and this is later precipitated in the zinc boxes by interaction with the caustic alkali there generated. This precipitate not only increases the cost of the subsequent smelting but may even lead to a resolution of the precipitated gold by preventing the reducing action of the zinc.

On the other hand a large excess of lime must not be added as it leads indirectly to an increased consumption of zinc. It may cause a fall in the percentage of extraction, due perhaps to a fall in solution pressure of the gold with respect to the solution, to a diminution in the rate of ionic migration by an increase of viscosity, or to the increased amount of some insoluble salt present in the solution owing to the larger quantity of lime used. These insoluble salts may impair the efficiency of the cyanide process either mechanically, by coating the valuable mineral particles, or chemically, by robbing the solution of the dissolved oxygen. The reducing effect of these salts may be great enough to cause a serious loss and they must be removed before the water used in making up the solutions is allowed in the mill. Lime has a further beneficial action as it aids in the precipitation of the zinc that is taken up in solution.

As there is always an excess of free cyanide in the solution the zincates remain dissolved until conditions arise favorable to the precipitation of the zinc as a simple or a double carbonate or as the sulphide. The cyanide of calcium formed by the addition of the lime is a solvent for gold, its relative efficiency as compared with an equal weight of potassium cyanide being as 35 is to 100.

Another point that should be borne in mind is that enough lime must be added to regenerate all the free cyanide possible. The correct quantity has been added, it is stated, when there is twice as much lime as zinc in the solution. The foregoing remarks will suffice to show, from the chemical standpoint, the necessity for care when making additions of lime.

Coagulation of Slimes

Lime plays yet another part, equally useful, in cyanide practice. It promotes settlement of the slimes by coagulation. For those who are unacquainted with the metallurgy of gold and silver ores it may be briefly stated that the ore is finely ground so as to liberate or expose the precious metal in its elemental or combined state, and the slimes are then treated with cyanide solution which dissolves the gold or silver. As these are now in solution, the solution must be separated from the worthless gangue.

The separation may be effected, of course, in some form of filter-press, but another method is to allow the solid particles to settle in a tank leaving a clear solution on top, which is then run off. The addition of lime causes the solids to subside more rapidly, which is important as time is valuable and a mill should be as compact as possible without sacrifice of efficiency or tonnage.

A short discussion of the possible reason for the coagulation effect of lime on ore-slimes is of interest. To understand the subject, however, the reader must have some knowledge of the Ionic Theory. This theory supposes that an electric current is conveyed in a solution by moving particles known as ions. Positive ions are called cations as they appear at the cathode or negative pole, negative ions are called anions as they appear at the anode or positive pole.

An ion is an atom, or group of atoms functioning as one, which bears a charge of electricity by virtue of which it is prevented from reacting as an atom. In a solution of lime-water, therefore, we have calcium hydrate molecules, calcium cations and hydroxyl anions, the dissociation coefficient depending on the concentration. The coagulating power of an electrolytic depends largely on the valency of the cation. In the language of the ionic theory we may write $Ca(OH)_2$ as $\overset{++}{Ca}.\overset{-}{OH}.\overset{-}{OH}$.

The quartz particles composing the gangue are presumed to bear negative charges. As like charges of electricity repel each other a tendency to prevent the ready settlement of the quartz would exist. Lime goes into solution with the production of positive ions in excess and these positive ions neutralize the negative charges borne on the surface of the quartz particles and thereby deprive them of their repellent properties. A large excess of positive ions caused by the addition of too much lime would again give rise to a deflocculating effect by causing the quartz particles to assume a positive charge.

This explanation is not accepted by all metallurgists as coagulation has been observed in instances where the particles absorb ions of the same electric sign and where a mutual repulsion should therefore exist. It may be that such a

phenomenon is due to special conditions. Coagulation cannot be ascribed to any one, but jointly to several factors; like charges must always repel, but the repulsive force may be obscured by some other factor, which becomes predominant under conditions peculiarly favorable to it.

With respect to the relative efficiencies of lime and chalk (calcium carbonate) in the promotion of settlement it has been experimentally determined that chalk is the more efficient but that it causes a greater consumption of cyanide as the CO_3 ions it introduces "facilitates hydrolytic action in the cyanide solution." It must not be reasoned from this that lime air-slaked to the carbonate will cause gangue to subside more rapidly. The following table gives the relative weights of different electrolytes that cause equal rates of settlement.

Substance	Relative Efficiency
Aluminum sulphate	100
Lime	654
Magnesia	748
Calcium carbonate	1215

Lime is added either as white lime or as gray lime, the latter deriving its color from the greater percentage of impurities it contains. White lime is preferable unless the presence of a nearby body of limestone and distance from one's base of supplies renders the use of gray lime more economical.

The lime is added either in crude form to the ore before treatment or as milk-of-lime to the pulp. The latter is the better method, as slaked lime is about 30 per cent more soluble than unslaked lime and it has a more pronounced settling effect. One part of slaked lime is soluble in 600 parts of water whilst it requires 800 parts of water to dissolve one part of unslaked lime.

In cyanide practice the amount of lime used depends, among other things, on the acidity of the ore. The aim is to use just enough to protect the cyanide and insure a sufficiently rapid settlement of the solids. The protective alkalinity of the solution is ordinarily maintained at from two-tenths to 1 lb. of lime per ton of ore. Other benefits resulting from the use of lime that have been observed are: (1) the increased amount of "sand" collected in mills employing the sands treatment; (2) a saving of time in the treatment; (3) a higher recovery by amalgamation.

In the Flotation Process

Lime has found a limited use in the flotation process with such ores as need an alkaline pulp. It is not, however, considered as desirable an agent as the alkaline sodium compounds. Its beneficial effect is presumed to be largely due to the precipitation of some soluble deleterious salt.

At Miami it was found that the lime when added to the tube-mill feed gave better results than when the addition was made at the head of the flotation cells. In another experiment lime was added (a) directly to the cell and (b) it was circulated with the pulp before going to the cell. The apparent recoveries were respectively 61.3 per cent. and 69.5 per cent. and the grade of concentrates 16.2 per cent. and 21.1 per cent. copper. Lime makes the froth darker and stronger but less mobile. It seems probable that the best results would be obtained when the lime is added as lime-water.

The application of lime to mill practice having been briefly reviewed, it will be of interest to consider its uses in smelting.

In Smelting Practice

Limestones are classified by metallurgists largely according to their chemical composition. A limestone rich in calcium carbonate and correspondingly free from impurities is known as a high-calcium limestone. When magnesium carbonate is present in amounts greater than 5 per cent, we have a magnesium limestone. With more than 30 per cent. $MgCO_3$ we have a dolomite, and when the alumina and silica contents are from 15 to 20 per cent. the rock is called an argillaceous limestone.

In iron blast-furnace practice limestone is added to the charge to provide the lime for the slag. Limestone commences to be decomposed at 800 degrees C. according to the equation $CaCO_3+\text{heat}=CaO+CO_2$. Only lime enters the smelting zone where it combines with the impurities in the ore and the coke ash to form a fusible slag. A basic slag readily takes up the silica thereby making a low-silicon pig-iron, and the lime reacts with iron sulphide thereby preventing the sulphur from entering the iron ($FeS+CaO+C=CaS+Fe+CO$).

An average lime content in the slag from hot furnaces is from 40 to 45 per cent. The amount of limestone to be added depends necessarily on the amount and nature of tht gangue in the ore; in one district about 100 lbs. of limestone are required to flux 330 lbs. of ore.

In the foundry, limestone is added to the cupola in amounts varying from 0.5 to 1.5 per cent. of the weight of the metal charged. Its function is to flux the ash and dirt and to absorb part of the sulphur.

High-calcium limestones and dolomite are used in the blast-furnace; their value depends both on the composition of the ore and on the amounts of silica, sulphur, phosphorus and alumina they themselves contain. As the limestone is used to supply the base for the slag, in other words, to flux the acid portions of the ore, it must be as free as possible from acid impurities. Ordinarily it contains less than 2 per cent. of silica and alumina. The sulphur and phosphorus usually are present in unimportant proportions; in the manufacture of Bessemer iron the phosphorus content of the limestone should not be in excess of 0.1 per cent. One pound of $MgCO_3$ suffices to flux 0.2867 lbs. of silica whilst 0.2896 lbs. of silica are fluxed by one pound of $CaCO_3$. Magnesia is said to be less efficient than lime for the removal of sulphur, but where the ore does not contain much sulphur a lower grade of limestone provides enough lime to combine with the sulphur in the fuel.

In the basic open-hearth process the slag is kept very basic by the addition of lime, to enable it to dissolve all oxidized phosphorus, to retain the manganese and as much sulphur as possible. From 5 to 30 per cent. of lime is added with the pig and scrap according to the percentage of impurities in the metal. More lime is added as the amounts of silicon and phosphorus increase.

The slag contains 35 to 45 per cent. of lime (CaO), the limit being 55 per cent., beyond which point it becomes too viscous. The bottom of a basic hearth is made of calcined magnesite and anhydrous tar, as magnesite provides a more permanent lining than dolomite. Dolomite is used, however, for the working bottom.

The limestone used in the open-hearth process should contain as little silica, iron and aluminum oxide, and $MgCO_3$ as possible and be rich, therefore, in calcium carbonate. Limestones which contain more than 3 per cent. silica or 4 per cent. $MgCO_3$ are undesirable, because the silica hinders the removal of silicon and phosphorus from the metal and the magnesia increases the specific heat of the slag. The following analyses indicate the grade of flux used by one company:

	SiO_2	$Al_2O_3Fe_2O_3$	$CaCO_3$	$MgCO_3$
Dolomite (1)	0.96	0.57	52.82	45.51
(2)	0.82	1.06	53.71	44.91
Limestone	2.18	0.72	95.24	1.86

The Ca-Mg-Al (calcium-magnesium-alumina) silicates are gray in color; they are crystalline when the alumina content is low, becoming vitreous as the percentage of alumina increases. The following table shows the respective fluxing capacities of lime and magnesia:

1 lb. CaO combines with 0.535 lb. SiO_2 to form a mono-silicate slag.

1 lb. CaO combines with 0.803 lb. SiO_2 to form a sesqui-silicate.

1 lb. CaO combines with 1.070 lb. SiO_2 to form bi-silicate.

1 lb. MgO combines with 0.75, 1.125, 1.5 lb. SiO_2 to form corresponding slags.

Smelting Non-Ferrous Ores

The iron-calcium silicates are those commonly met with in the smelting of non-ferrous ores. The lime—CaO—is often partly replaced by MgO, BaO, ZnO and Al_2O_3. Hofman states that, broadly speaking, "a progressive replacement of

FeO by CaO has a tendency to lower the formation temperatures and then to raise them beyond the starting point." Slags with 10 to 20 per cent CaO have a higher formation temperature than those in which the lime content varies from 32 to 36 per cent.

In blast-furnace smelting mono-silicates are commonly made; "in copper smelting there is greater freedom of choice as regards silicate degree and replacement of FeO by CaO on account of the smaller danger of slagging copper in the presence of sulphur than there is in the case of lead—the presence of CaO, within limits, increases the fluidity of iron-silicates."

Limestone has been used in the blast-roasting of galena for the purpose of sintering the partially-roasted concentrates and of aiding mechanically in the oxidation by keeping the charge open. In the Huntington and Heberlein process the galena-limestone mixture was subjected to a preliminary rough-roast, but in Savelsberg's later process this step is omitted. The principle underlying blast-roasting seems to be that oxidation is more rapid owing to the large amount of air in contact with the charge, the quick elimination of SO_2 and consequent tendency to prevent the formation of sulphate and the evolution of sufficient heat to produce a sintered mass.

Lime as a Gas Absorbent

The SO_2 and SO_3 gases formed at smelteries are injurious to the health and provocative of law-suits when permitted to escape freely into the atmosphere. Among the absorbents advocated milk-of-lime has found some favor. The gases are led up a series of towers liberally sprayed with the reagent and the obnoxious constituents are precipitated.

In Slag Brick Making

Lime is used in the manufacture of bricks made from granulated basic blast-furnace slag. Its binding qualities depend on its combination with atmospheric CO_2 and probably on the formation of a hydro-silicate. Acording to Moissan, lime is fusible at 2,000 degrees C., the fusibility being considerably reduced by impurities such as silica and iron oxide. Pure lime is used for making some kinds of crucibles. Limestone mixed with 25 per cent. of fireclay is employed for lining of the test in a cupellation furnace.

Whilst the practical application of lime in metallurgy has been sketched only in broad outline, special stress has been laid on the chemistry with the idea always in mind that the producer of lime will be most benefited when his understanding of the principles involved is most clear.

Production of Cement in North China

THE CHEE HSIN CEMENT CO., according to the Consul General P. S. Heintzleman, Tientsin, in the U. S. Commerce Reports, controls the cement business of North China. This is a purely Chinese concern established in 1906. The plant is located at Tangshan, a small town about 100 miles northeast of Tientsin on the Peking-Mukden Railway. It is equipped with modern machinery and obtains its supply of limestone on the site of the works. Its product is known as gray Portland cement, the white Portland cement not being manufactured. Large rotary kilns are used with both the wet and the dry process. The company's normal output is 600,000 bbls. per annum, but the sales during 1918 exceeded 800,000 bbls.

Domestic and Export Prices of Chee Hsin Cement

The company's cement is packed as follows: Casks—gross, 400 lbs.; tare, 25 lbs.; 375 lbs. net. Bags—gross, 190½ lbs.; tare, 3 lbs.; 187½ lbs. net. The selling prices were as follows at the close of 1918: Small quantities for delivery in Tientsin, bags, $2.50 Mexican or $1.96 United States currency; casks, $5.40 Mexican or $4.24 United States curency. Large quantities for delivery in Tientsin: Bags, $2.30 Mexican or $1.80 United States currency. The selling price abroad was $3.54 Mexican or $2.78 United States curency per bbl. of 375 lbs. net, f. o. b. Chinwangtao.

The Chee Hsin Cement Co. ships principally to Java and the Philippine Islands. The railways and mines, which are the largest consumers of cement in this region, use this company's product almost exclusively. The prices of this cement are much lower than those charged for the imported product; moreover, the company's product does not pay likin (transit) dues upon being forwarded into the interior, while foreign cement shipped inland is subject to these charges.

Other Domestic Cements Used in North China

Other leading cement works in China are the Huang Shih Kang, located in Hupeh Province on the Yangtze, owned by the Chee Hsin Cement Co. and acquired four or five years ago. This cement is known as Hupeh Portland cement and sold under the Pagoda brand. The annual output is 200,000 bbls. Small quantities of the cement manufactured by the Green Island Cement Co. (Ltd.), Hongkong, and the Haiphong Cement Co. (Ltd.), Haiphong, are disposed of in North China, but the combined sales probably do not amount to more than a few thousand barrels a year. Green Island is a gray Portland cement packed in barrels of 375 lbs. net and in bags of 250 lbs. net. Haiphong cement is packed only in casks of 375 lbs. net. There is a Japanese cement works at Dalny, but no information regarding the concern is available.

The amount of foreign cement imported into Tientsin through the maritime customs during 1917 was 1,151 tons, valued at $19,364, while the Chinese cement exported abroad from Tientsin for the same year amounted to 237 tons, valued at $2,584; Chinese cement exported to other Chinese ports was 38,072 tons, valued at $424,057. From this it is seen that practically all the cement used in this territory is domestic produced.

Magnesite in the Flooring Industry

CAUSTIC MAGNESITE, that is, magnesite which has been calcined to the point where it contains 2 to 4 per cent carbonic acid, and magnesium chloride are both used in making composition flooring. The production of composition flooring declined during the war owing to the difficulty of obtaining satisfactory caustic magnesite, and on account of the high prices of both this and the magnesium chloride. Before the war, the chloride came from Germany. These high prices have compelled the flooring makers to raise the price of composition flooring to a point which if continued may make it difficult to market this material.

The principal manufacturers of composition flooring have lately organized the National Association of Composition Flooring Manufacturers. This association is cooperating with the U. S. Bureau of Standards in establishing a standard for composition flooring and a standard quality of magnesite to be used therein. This investigation is being carried on at the Pittsburgh laboratory of the Bureau.

The preparation of caustic magnesite should be by a process in which a uniformly controlled temperature is possible, and one of the principal difficulties has been a lack of uniformity in calcination temperatures, as a result of which a uniform product has been hard to secure. The methods of calcination that will be worked out may be expected to be different from those ordinarily employed in dead-burning magnesite for refractory purposes.

There is a large demand for composition flooring in this country, and if these two main obstacles—namely cost, and lack of uniformity of the product—can be overcome, there should result a great expansion of the magnesite market in this industry.

Merchandizing of Agricultural Limestone

Some Examples of Advertising in Newspapers, Circulars, Letterheads, Slip-ins, Etc., and Their Results

AGRICULTURAL LIMESTONE being a low-priced staple commodity sold on a small margin of profit, few individual producers of it are inclined to spend the sums necessary for really effective newspaper or periodical advertising. Many have tried it with varying degrees of success.

Probably the most important experiment ever carried out in this line by a single producer is that of the Ladd Lime & Stone Co., Cartersville, Ga. Through the courtesy of L. J. Backus, general manager, it is possible to give here some interesting figures from his experience.

Mr. Backus carefully tabulated the results of a $20,000 advertising campaign to find the advertising cost per inquiry and per ton of sales directly attributable to the advertising. These are the results generally of display advertisements of from ¼ to a whole page, except in the case of newspapers, where the space used varied from 3 column inches up.

County Newspapers Give Best Results

In general the best results were from advertisements in the local county newspapers. (This has been the experience of other producers also.) Such advertisements cost about $1 per inquiry or 8c per ton of stone sold. The record of advertising in the "Southern Cultivator," a semi-monthly periodical popular in the South, was a shade better—at the same cost per inquiry—7½c per ton of material sold.

Another farm periodical of general circulation, "Southern Farming," showed a cost of $3.08 per inquiry and no sales. The difference between these two was difficult to determine, as the character of the circulation was apparently the same.

Another farm paper of general circulation that was tried is the "Progressive Farmer," which showed results of $2.34 per inquiry and $2.00 per ton of material sold.

City newspaper advertising was tried by as much as half a page insertions in the semi-weekly edition of the "Atlanta Constitution" which has a large suburban and country circulation. The results of this advertising were 91c per inquiry and 33c per ton of sales.

Conclusions on Newspaper Advertising

The only general conclusion the advertiser was able to draw from these experiments were that the larger the advertisement the better were the results; and that reproductions of photographs, or any attempt at general illustrations were a total failure. The timely worded advertisements like those given in this article were by far the best pullers. Catchy pen-and-ink sketches to drive home an argument were very useful.

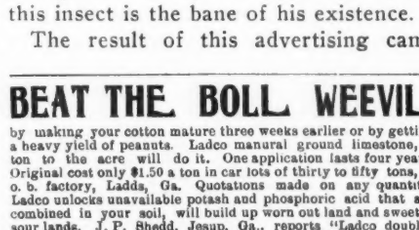
Studying the two sample advertisements given and the local conditions it is not difficult to see that they pulled because of the prominence given to the cotton planters' problems, and practically every farmer in the South is a cotton planter in some degree. The words "Boll Weevil" make any Southern cotton grower sit up and take notice, for this insect is the bane of his existence.

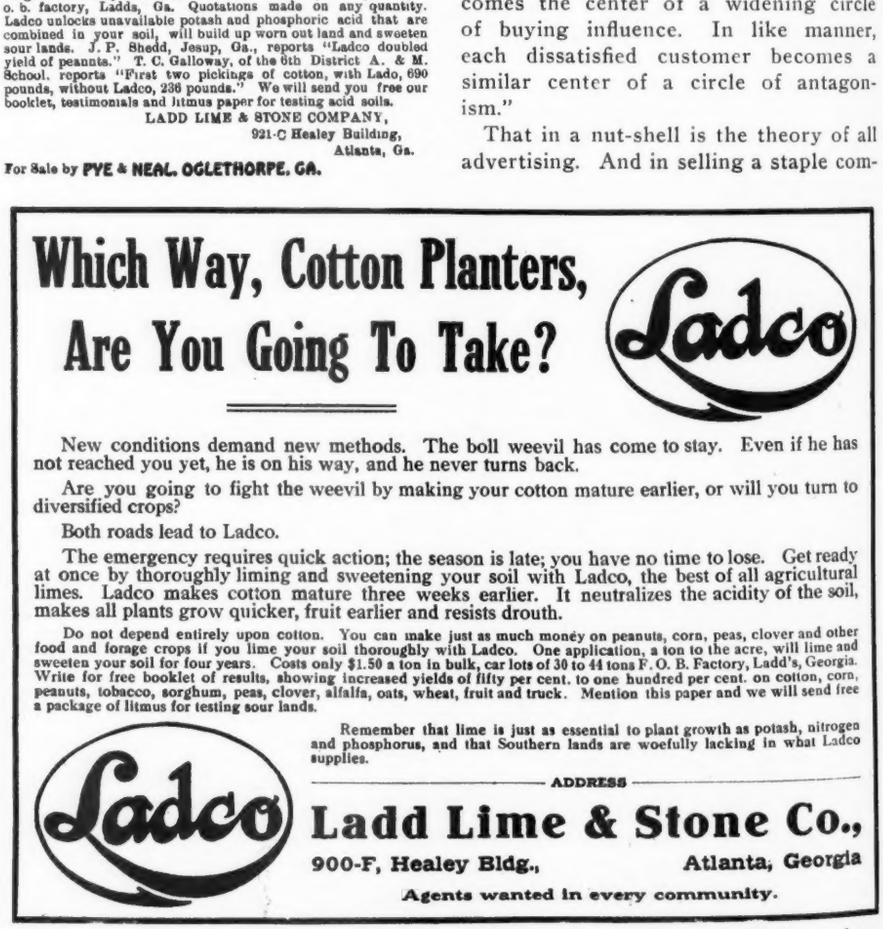
The result of this advertising campaign as a whole was not considered very satisfactory, but doubtless an advertising expert would consider the results obtained from the county newspapers and the "Southern Cultivator" a very good showing.

Actual Sales Cannot Be Expected to Pay for Advertising

George Frank Lord, head of the advertising department of E. I. Du Pont De Nemours & Co., who probably places as much or more advertising than any one man in this country has said: "Remember, no advertised business succeeds wholly on the basis of sales made by advertising. Ordinarily, the advertising cost of such sales is greater than the margin of profit on the sale. The only chance for profit lies in the repeat sale to the same buyer or sales to his friends, and these must be based on satisfactory service. Each satisfied customer, like the pebble thrown into still water, becomes the center of a widening circle of buying influence. In like manner, each dissatisfied customer becomes a similar center of a circle of antagonism."

That in a nut-shell is the theory of all advertising. And in selling a staple com-


BEAT THE BOLL WEEVIL
by making your cotton mature three weeks earlier or by getting a heavy yield of peanuts. Ladco manural ground limestone, a ton to the acre will do it. One application lasts four years. Original cost only $1.50 a ton in car lots of thirty to fifty tons, f. o. b. factory, Ladds, Ga. Quotations made on any quantity. Ladco unlocks unavailable potash and phosphoric acid that are combined in your soil, will build up worn out land and sweeten sour lands. J. P. Shedd, Jesup, Ga., reports "Ladco doubled yield of peanuts." T. C. Galloway, of the 6th District A. & M. School, reports "First two pickings of cotton, with Lado, 690 pounds, without Ladco, 236 pounds." We will send you free our booklet, testimonials and litmus paper for testing acid soils.
LADD LIME & STONE COMPANY,
921-C Healey Building,
Atlanta, Ga.
For Sale by PYE & NEAL, OGLETHORPE, GA.


Which Way, Cotton Planters, Are You Going To Take?
Ladco
New conditions demand new methods. The boll weevil has come to stay. Even if he has not reached you yet, he is on his way, and he never turns back.
Are you going to fight the weevil by making your cotton mature earlier, or will you turn to diversified crops?
Both roads lead to Ladco.
The emergency requires quick action; the season is late; you have no time to lose. Get ready at once by thoroughly liming and sweetening your soil with Ladco, the best of all agricultural limes. Ladco makes cotton mature three weeks earlier. It neutralizes the acidity of the soil, makes all plants grow quicker, fruit earlier and resists drouth.
Do not depend entirely upon cotton. You can make just as much money on peanuts, corn, peas, clover and other food and forage crops if you lime your soil thoroughly with Ladco. One application, a ton to the acre, will lime and sweeten your soil for four years. Costs only $1.50 a ton in bulk, car lots of 30 to 44 tons F. O. B. Factory, Ladd's, Georgia. Write for free booklet of results, showing increased yields of fifty per cent. to one hundred per cent. on cotton, corn, peanuts, tobacco, sorghum, peas, clover, alfalfa, oats, wheat, fruit and truck. Mention this paper and we will send free a package of litmus for testing sour lands.
Remember that lime is just as essential to plant growth as potash, nitrogen and phosphorus, and that Southern lands are woefully lacking in what Ladco supplies.
Ladco
ADDRESS
Ladd Lime & Stone Co.,
900-F, Healey Bldg., Atlanta, Georgia
Agents wanted in every community.

Two examples of newspaper advertising which had the strongest pulling results

modity like lime or limestone, the value of service and the purchase of good will for the particular brand of material advertised can not be over-emphasized.

Mr. Lord says further: "If we advertisers adopt such a motto as "He profits most who serves best," if we accept as true the principle of supremacy of service, how will it affect our activities? Let us first consider the advertiser—the business man who wants to extend his commercial relations with his fellowmen. If he truly regards his business as a service to mankind, he will see to it that it renders the best service possible, and that his offers of that service through publicity shall be made in good faith. He will realize that the aim and object of his advertising is not to sell goods, but to buy satisfied customers.

"With such realization, how could he sanction misrepresentation or exaggeration in his advertisements? He would, in fact, not only avoid such false promises of service, but would also state the limitations of the service he offered, to make sure that no customer could become dissatisfied because his purchase failed to deliver all the service promised.

"It may strike you as Utopian to advocate that advertisers state the limiting features of their service or products and thereby restrict their sales to those who would not mind such limitations. Not at all! This is really the shrewdest method of doing business."

The seller of agricultural lime and limestone is unusually fortunate because his advertisements can carry the unqualified endorsements of the foremost agricultural authorities of the world, as well as the testimony of satisfied customers. This is a priceless advantage over a new and unknown commodity which must depend on paid advertising to make a dent on the popular mind.

Other Advertising Mediums

The rural press is probably the most efficient means of reaching the greatest number of prospective purchasers, but there are other means, however, of creating and keeping the good will of customers and correspondents by means of advertising literature.

Attractive letterheads undoubtedly help considerably. Two are illustrated herewith. The one of the Waukesha Lime & Stone Co. is particularly notable. It is in the form of a four-page folder with the letter on the first page, of course, and with the two middle pages in the form of an attractive circular advocating the use of agricultural limestone. The fourth page is left blank for a continuation of the letter if required.

Some Circular Letter Experience

With regard to circular letters, the experience of the Ladd Lime & Stone Co., tended to prove that the ordinary undisguised circular with 1-cent postage accomplished even better results than the psuedo personal-letter type of circular. These facts were determined by a careful comparison made with a selected list of 1,000 names.

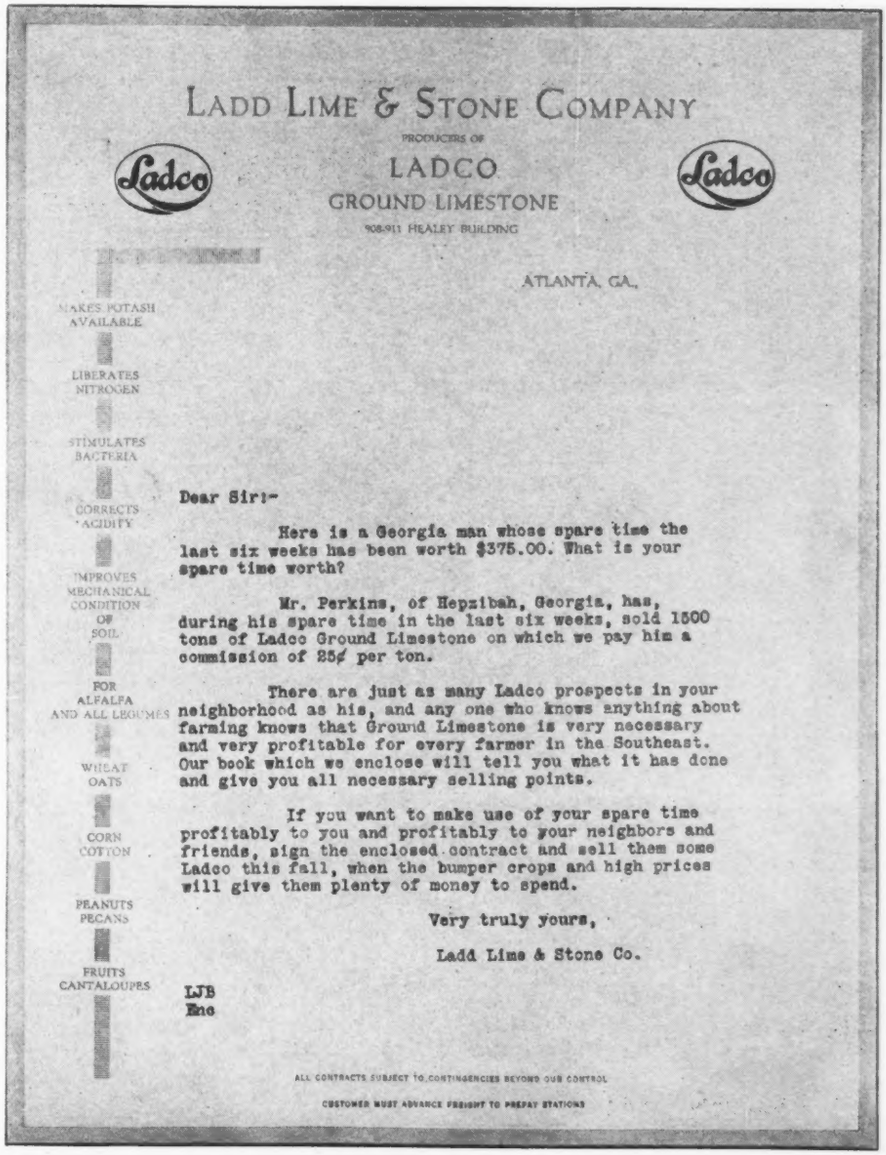
This merely illustrates the difference in methods and attitude between farmers and city business men. The ordinary business man's mail is so plentiful that he seldom can find time to give advertising circulars even passing attention, whereas the average farmer's mail is so scanty that he regards it all with equal interest, and the attempt to make the letter appear personal is entirely lost on him.

The same was proved to be true of the contents of the letters. The breezy undisguised advertising matter was more effective than a psuedo personal appeal. There again a farmer trait is apparent because the average farmer is perpetually on his guard against anyone who seems to try "to put anything over on him." He doesn't want to think he has been picked out as an individual target.

Enclosures for Correspondence

Slip-ins on separate sheets to be enclosed with all correspondence serve the same purpose as the letter folder described above. Four attractive miniature posters (the originals in colors) used by the American Limestone Co., Knoxville, Tenn., (formerly the American Ballast Co.), are shown herewith. The impression carried by these is often much more vivid than can be conveyed in words.

Another method the American Limestone Co., has of cultivating good will is by means of monthly calenders, one of which is shown in this article. (The original of this is also in colors.) One side of this is an attractive calender, the other side carries some instructive message in regard to the use of limestone.



LADD LIME & STONE COMPANY

PRODUCERS OF

LADCO

GROUND LIMESTONE

908-911 HEALEY BUILDING

ATLANTA, GA.

MAKES POTASH AVAILABLE
LIBERATES NITROGEN
STIMULATES BACTERIA
CORRECTS ACIDITY
IMPROVES MECHANICAL CONDITION OF SOIL
FOR ALFALFA AND ALL LEGUMES
WHEAT OATS
CORN COTTON
PEANUTS PECANS
FRUITS CANTALOUPES

Dear Sir:-

Here is a Georgia man whose spare time the last six weeks has been worth $375.00. What is your spare time worth?

Mr. Perkins, of Hepzibah, Georgia, has, during his spare time in the last six weeks, sold 1500 tons of Ladco Ground Limestone on which we pay him a commission of 25¢ per ton.

There are just as many Ladco prospects in your neighborhood as his, and any one who knows anything about farming knows that Ground Limestone is very necessary and very profitable for every farmer in the Southeast. Our book which we enclose will tell you what it has done and give you all necessary selling points.

If you want to make use of your spare time profitably to you and profitably to your neighbors and friends, sign the enclosed contract and sell them some Ladco this fall, when the bumper crops and high prices will give them plenty of money to spend.

Very truly yours,

Ladd Lime & Stone Co.

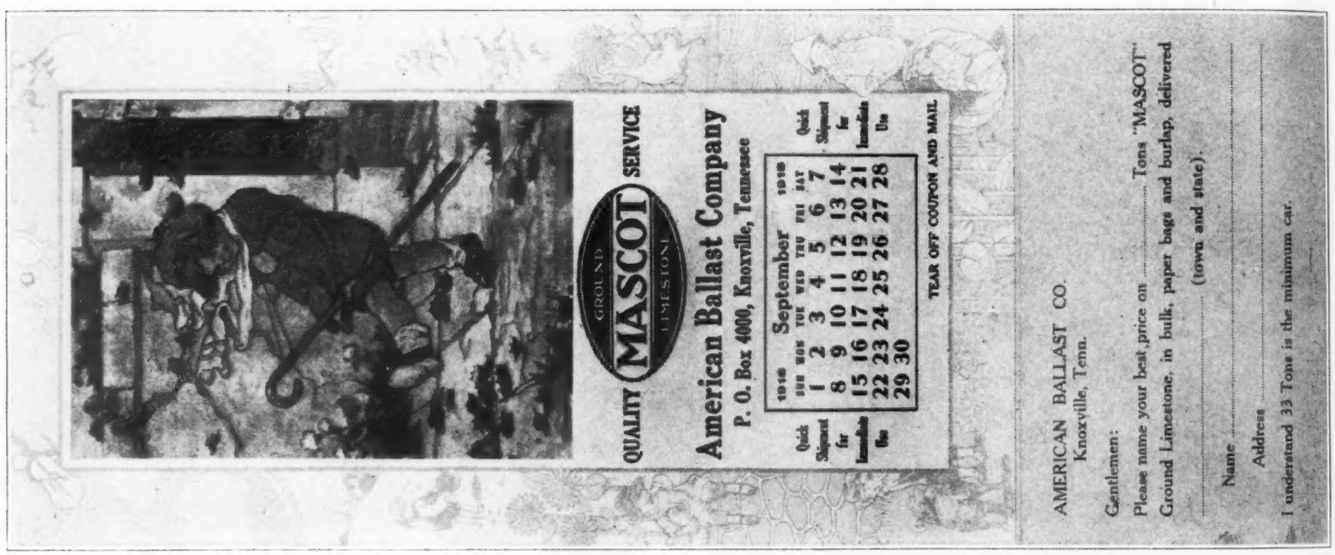
LJB
Enc

ALL CONTRACTS SUBJECT TO CONTINGENCIES BEYOND OUR CONTROL

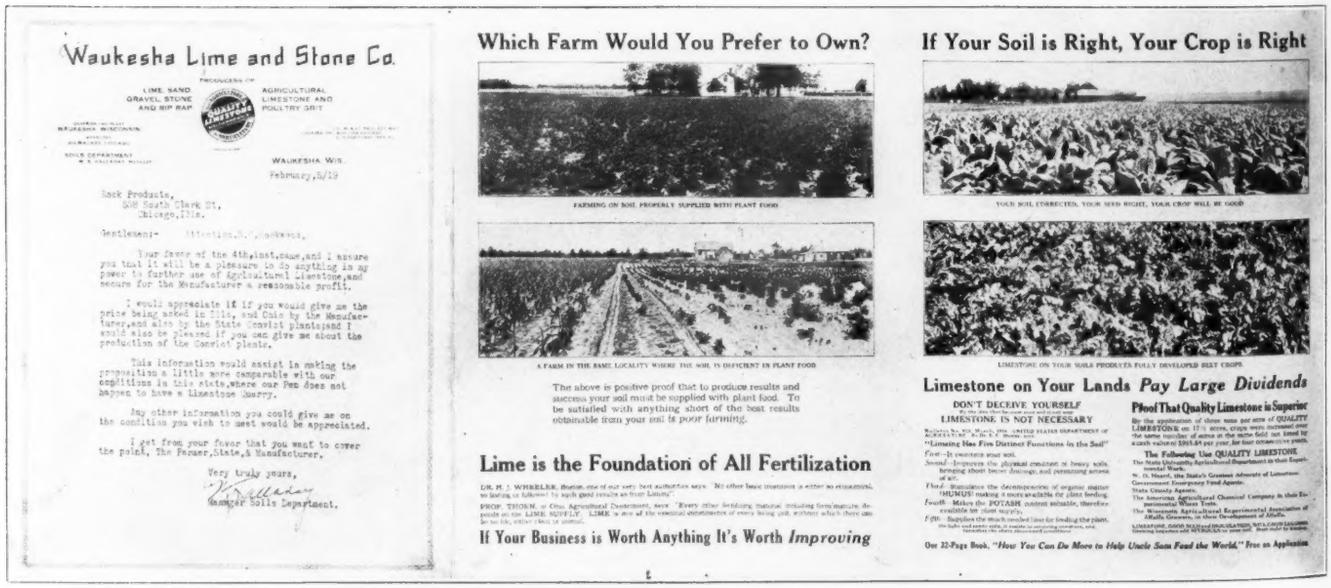
CUSTOMER MUST ADVANCE FREIGHT TO PREPAY STATIONS

An attractive letterhead and the kind of a letter that procured results

CAN YOU BEAT THIS FOR CLOVER?
Here's Mr. Antrim's Sedgefield Farm in North Carolina, waist-high with clover on June 6th, 1918. 300 acres of it. How was this done?—2 tons MASCOT LIMESTONE sown with corn in Spring 1918. This corn followed by wheat and sapling clover. If 2 tons of MASCOT does this for Mr. Antrim, you can bank on MASCOT doing pretty well by YOU. Don't guess! Write us for the facts.
COUPON POST CARD
We want to hear from you. This card is for your convenience.
BREAK the SEAL
MAIL the COUPON
USE the CALENDAR
American Ballast Company
Knoxville, Tennessee
POSTAGE WILL SPENT


QUALITY MASCOT SERVICE
GROUND LIMESTONE
American Ballast Company
P. O. Box 4000, Knoxville, Tennessee
Quick Shipment for Limestone
1918 September 1918
SUN MON TUE WED THU FRI SAT
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
22 23 24 25 26 27 28
29 30
Quick Shipment for Limestone
TEAR OFF COUPON AND MAIL
AMERICAN BALLAST CO.
Knoxville, Tenn.
Gentlemen:
Please name your best price on ..... Tons "MASCOT" Ground Limestone, in bulk, paper bags and burlap, delivered ..... (town and state).
Name .....
Address .....
I understand 33 Tons is the minimum car.

Two sides of a monthly calendar card—with detachable post-card for checking up results and getting prospects


Waukesha Lime and Stone Co.
PRODUCERS OF
LIME, SAND GRAVEL, STONE AND RIP RAP
AGRICULTURAL LIMESTONE AND POULTRY GRIT
WAUKESHA, WISCONSIN
SOILS DEPARTMENT
WAUKESHA WIS.
February 5/19
Rock Products,
608 South Clark St,
Chicago, Ills.
Gentlemen:- Attention Mr. Clarkson,
Your favor of the 4th inst. came, and I assure you that it will be a pleasure to do anything in my power to further use of Agricultural Limestone, and secure for the Manufacturer a reasonable profit.
I would appreciate it if you would give me the price being asked in Ills, and Ohio by the Manufacturer, and also by the State Convict plants, and I would also be pleased if you can give me about the production of the Convict plants.
This information would assist in making the proposition a little more comparable with our conditions in this state, where our Pen does not happen to have a Limestone Quarry.
Any other information you could give me on the condition you wish to meet would be appreciated.
I get from your favor that you want to cover the point, The Farmer, State, & Manufacturer.
Very truly yours,
Manager Soils Department.
Which Farm Would You Prefer to Own?
FARMING ON SOIL PROPERLY SUPPLIED WITH PLANT FOOD
A FARM IN THE SAME LOCALITY WHERE THE SOIL IS DEFICIENT IN PLANT FOOD
The above is positive proof that to produce results and success your soil must be supplied with plant food. To be satisfied with anything short of the best results obtainable from your soil is poor farming.
Lime is the Foundation of All Fertilization
If Your Business is Worth Anything It's Worth Improving
If Your Soil is Right, Your Crop is Right
YOUR SOIL CORRECTED, YOUR SEED RIGHT, YOUR CROP WILL BE GOOD
LIMESTONE ON YOUR SOILS PRODUCES FULLY DEVELOPED BEST CROPS
Limestone on Your Lands Pay Large Dividends
DON'T DECEIVE YOURSELF
LIMESTONE IS NOT NECESSARY
Proof That Quality Limestone is Superior
The Following Use QUALITY LIMESTONE
Our 32-Page Book, "How You Can Do More to Help Uncle Sam Feed the World," Free on Application

Letterhead in form of a 4-page circular—Fourth page is blank

Examples of miniature posters for slip-in enclosures in correspondence

A detachable mailing card forms the rest of the sheet.

Another form of advertising this company has tried is the giving away of little round whetstones with a celluloid back bearing the brand trademark. This company also makes liberal use of 1-oz. sample packages of limestone which can be enclosed in an ordinary letter.

The few examples given here are to show how only three progressive agricultural limestone producers are solving a very essential problem of the business. A great many other and possibly better examples exist, of course.

There is almost always a gap between publicity (and advertising) and the actual clinching of orders. If the results of advertising are not always as anticipated, it may or may not be the fault of the advertising. But before expending any considerable amount of money on advertising of any kind it is well to have advice from an advertising expert and an expert who knows how to reach the agricultural clientele, because undoubtedly much money has been wasted in advertising agricultural lime and limestone in the wrong way. Likewise much money has been wasted because the advertising was not carried through to its logical conclusion.

The sales manager or advertising manager of each producing company must of necessity study farmer psychology to a certain extent.

Co-operation of Lime and Fertilizer Manufacturers

Southern Fertilizer Men Evidently Are Not Yet Very Enthusiastic About the Virtues of Agricultural Lime

A GOOD DEAL has been said lately both by lime and fertilizer men about co-operation and mutual dependence upon one another. Lime is encroaching on the fertilizer preserves, of that there is no question, and it is the fertilizer men who are beginning to see the light of day.

Especially has agricultural lime gained a foothold in the South, and that within a very short time. With the activity of the Lime Association in that territory we are sure to see great gains in the use of lime in southern agriculture, and incidentally of course, see southern farmers get out of their ruts and be more progressive.

Are the fertilizer men, whose stronghold the South has ever been, watching this growing use of lime with that hearty spirit of co-operation we would expect of them after various statements about the need of their recommending lime? Judge for yourself from the following, which is printed verbatim from the July 19 issue of the American Fertilizer. It is unsigned and therefor presumably expresses the opinion of the editor, who is also secretary and spokesman for the National Fertilizer Association:

"The use of lime applied to soils to increase crop production dates back to ancient history. The limitations of its influences have been fully determined. While calcium is one of the ten elements essential to plant growth, yet almost all soils have a surplus for this purpose, and acid phosphate carries a large amount of lime in addition to its phosphate content.

"Every few years some one or more persons start a lime boom and, as a rule, the writer believes with no ulterior motives in these booms all discretion as to where liming is needed is lost sight of, and the recommendation becomes promiscuous. It has been reduced to the following terse summary: Lime, legumes, livestock and prosperity. Many things were long ago written into agricultural texts that have been handed down or copied down from book to book—the writers hesitating to tackle the large and conflicting experimental data on these subjects. Lime is one of these problems, and let us suggest that its differing effects on different soils and to different crops may account for the conflicting data.

"Reading from plats rather than from books, the writer concludes that it is impracticable and unnecessary to lime generally in the cotton belt of the southeastern part of the United States. There are certain crops and certain soils that are improved by liming. Very acid soils, particularly of the Portsmouth series, should be limed when drained; soils of the Piedmont section that have been puddled by wet plowing are improved physically by applications of caustic lime, the same results can be accomplished by a heavy application of manure or woods mold. Alfalfa requires a heavy application of lime before seeding, and the same is probably true for red clover. Peanuts are benefited by liming, but this does not usually obtain for our common southern legumes: Cowpeas, velvet beans, crimson clover, and hairy vetch; these are our main clover substitutes. Wheat may be improved by liming, but this is not generally true for cotton, corn, and many of the truck crops. Legumes are necessary for livestock and livestock for diversified farming, but let us remember that we can make legumes on our normal soils without liming.

"The facts that we wish especially to stress are that lime is valuable where needed, and for certain crops that have high lime requirements but that the need for liming is by no means general. The users of lime should be very discriminating because applications of lime are costly, consuming and laborious, and, where not needed, they are absolutely worthless."

Iowa Quarry Co. Preparing for Hard Road Boom

THE LINWOOD STONE & CEMENT CO., owner of land and quarries in Buffalo township, Iowa, containing rich deposits of limestone, is spending between $100,000 and $125,000 on a new plant which will increase the company's daily average output from 400 tons of crushed rock to 1,800 or 2,000 tons, exclusive of considerable riprapping material. The work will be completed and the new plant running full capacity sometime between September 20 and October 1, according to an announcement made by J. F. Schroeder, secretary-treasurer and general manager of the concern.

New and heavier machinery is being installed in the crushing plant, larger steam shovels in the quarry and the entire plant is being equipped for electric operation. Every known labor-saving device on the market applicable to the work has, or will be, installed.

Practically all the concrete work has been completed and workmen are now building the wooden bins. Considerable of the machinery ordered for the new plant is already on the ground and will be installed this month and next. The power line is now being extended to the quarry and arrangements are being made for building a narrow-gauge railway from the quarry to the river bank for loading on barges.

The plant when completed will be one of the most modern of any. A building committee representing directors of the company visited a number of quarries and stone-crushing plants throughout the country before working out plans for the new plant.

Company Re-Organized

The Linwood Stone & Cement Co., formerly the Linwood Quarry Co., was reorganized on February 1 and the capital stock increased from $75,000 to $250,000, all of which is paid up.

Following the reorganization the company acquired control of the old Dutcher farm of John G. and Jerome E. Dutcher, adjoining the quarry and comprising 215 acres. Later the company purchased the Brownlie property comprising 62 acres. Both of these properties contain rich deposits of limestone suitable for both concrete and cement, and the dust is also very valuable as an agricultural fertilizer.

After extending the confines of the old quarry the company voted on a plan of expansion entailing the erection of an entirely new plant, purchase of larger machinery and other improvements necessary to bring the output up to the anticipated demand for crushed rock.

Officers of Company

When the company was reorganized J. W. Crowley was retained as president, A. E. Horst, vice-president, and J. F. Schroeder became secretary-treasurer and general manager. The following are directors: J. W. Crowley, A. E. Horst, J. F. Schroeder, A. E. Carroll, D. E. Keeler, Otto Hill, A. C. Klindt, Dr. Neufeld and R. J. Walsh.

A large number of tests were completed on the material quarried by the engineer in charge of the Iowa Agricultural College at Ames. Mr. Myers, the assistant engineer for the Iowa State Highway Commission also inspected the plant and materials on the ground and secured a number of samples. Crushing tests gave 40 to 56 per cent above the standard required, and the French coefficient of wear showed a test of 40 per cent above standard required.

[Iowa has lost faith to a considerable extent in gravel roads and is now talking nothing but concrete.]

American Potash Trade Need Not Fear Germans

WASHINGTON, D. C.—White S. Gale, of the Geological Survey, who returned from Europe, says in the Philadelphia Record that the American potash industry need not fear much competition from the Germans, but that the French had potash available for export to sell at New York from $150 to $170 a ton.

Lack of shipping facilities and labor unrest were said by Gale to be the important factors in the German situation.

Demurrage on Sand and Gravel

IT SEEMS that the railroads have been preferential to the coal mine operators in its demurrage rules in regard to unbilled loads held for disposal. In a letter to C. Rippin, Chairman, Demurrage Committee, the National Industrial Traffic League, Ben Stone, Business Director of the Illinois Sand and Gravel Producers' Association maintains that the sand and gravel production cannot be longer considered at will, but must be recognized and treated as a basic material.

He further maintains that the sand and gravel industry has practically the same conditions to meet that the coal producers have and that the demurrage rule providing exemption on empty cars placed for loading and unbilled loads held for disposition is unduly preferential to the coal industry and it is hoped that this unfair discrimination may be removed.

This has brought the subject before the committee and it will be considered at their next meeting. The Demurrage Committee was greatly instrumental in the re-establishment of the average agreement on outbound loads on July 20.

Provide Contingent Fund to Meet Emergencies

EVERY PRODUCER of sand and gravel should consider carefully how his business may be affected by the rapidly changing conditions, says the Bulletin of the Illinois Sand and Gravel Producers' Association. It seems inevitable that costs of production, repairs, supplies, fuel, etc., will be higher. We all know that the average producer of sand and gravel would go broke if he did not obtain better prices and have a larger volume of production during the latter half of the season than he usually gets during the first half.

It is our opinion that until the labor market can be stabilized there should be created and added to the actual cost, a contingent fund to provide protection against probable loss from strikes, tie-ups, car shortage, and other difficulties which cannot be definitely anticipated.

Fear Increased Freight Rates

Although No Real Definite Information Is Obtainable, Indications Point Toward Rate Increase

AN INCREASE of freight rates will affect all industry, either directly or indirectly. In some cases it will mean a direct loss in reduced business resulting from increased ultimate price, which the consumer will have to pay for materials. This problem is well worth consideration of all business men in order that planning before hand the results may be made as favorable as possible.

Following is a discussion of this subject as it applies to the sand and gravel producers.

Mr. E. Guy Sutton, Business Manager of the National Association of Sand and Gravel Producers has been corresponding with Mr. Edward Chambers, Director of Traffic, in order to find out how much truth there is in the rumor of a general advance in freight rates, whether this will include sand and gravel and if there is to be an increase when it may be expected to take place.

Mr. Sutton says:

"While Mr. Chambers has not directly answered the question, it is believed that his reply is capable of only one interpretation, and that is, that an increase in rates may be expected.

"The outcome of the demands of the railroad employes for higher wages and the question as to what action Congress will take in providing further funds to meet the increasing deficit, are probably the contingencies to which Mr. Chambers refers. The possibilities are that wages will be increased and that Congress will not make further appropriations before taking a recess for the month of August. An increase in freight rates, therefore, appears inevitable.

"According to information obtained from reliable sources, the advance, if made, will be 15 per cent, and will apply on all commodities, including sand and gravel.

"The questions that nationally confront the sand and gravel producers in giving consideration to the matter are these: (1) Can the industry survive another advance of from 10 cents to 20 cents a ton? (2) Sand and gravel rates were increased from 25 to 150 per cent by General Order No. 28—the average advance throughout the country being over 54 per cent. Other commodities including slag—a directly competing material, were advanced only 25 per cent. Is this a fair proposition? (3) Existing rates on sand and gravel are higher in most instances than the price of the material at the pit. Is this reasonable and consistent with rates on other commodities? (4) Many contractors have taken work based on the existing rates. Is it right that these contractors shall face bankruptcy and the public suffer because of unfinished work? (5) Much private work is deferred already because of the high rates. Is it to the public interest that further curtailments in construction work be permitted? (6) The present excessive freight rates are responsible for the development of local deposits from which deliveries may be made by teams and trucks. Is it to the public interest that the use of inferior material should be encouraged and that plants involving heavy investments should be forced to become idle?

"It appears, therefore, that the first step to be taken in the fight, as already recommended, is for each producer to wire the representative of his congressional district and one or both senators, at once, expressing his views on the subject. Don't wait for the other fellow to do it; your business is in jeopardy as well as his."

Ben Stone, Business Director of the Illinois Sand and Gravel Producers' Association, says:

"The much expected advance in freight rates is taking form. The President has asked Congress to name a commission to consider and adjust wage complaints of railway employes, with the understanding that the same commission will make definite recommendations as regards rates in order that sufficient revenue may be earned by the carriers to cover any awards made employes. The railway trainmen have said to the Administration that their wages and the cost of living must be brought closer together before the first of October; else "protective measures will be taken." This means only one thing to the shipping public—freight rates must be increased—and as Congress has voted to forego its usual summer vacation in order to consider the matter, we may expect the answer soon.

"From a standpoint of intrinsic value and service performed by the carriers, sand and gravel are probably the highest rated of all commodities. It is contended that the rates on these commodities must be made with regard for conditions under which they are produced and marketed, bearing in mind, of course, that the carrier is entitled to a profit based on cost of service performed and capital invested.

"The very nature of these commodities, however, makes it imperative that transportation charges be made very largely, if not wholly, on the time honored principle that rates must not be greater than the traffic will bear and continue to move freely.

"I do feel that the National Association should go on record with the Railroad Administration now and without delay, as being unalterably opposed to any further advance in the rates."

Producers Keep Abreast of New Requirements

"SPECIFICATIONS FOR SAND AND GRAVEL" Ben Stone, business director of the Illinois Sand and Gravel Producers' Association, says is the topic of an editorial published in ROCK PRODUCTS of July 19th, worthy of very careful reading. "If you have already read it, read it again. Another subject which is receiving a great deal of attention from engineers is gradation. We have been informed that the Association of Highway Engineers, Middle Western States, is making a special study of this subject with a view to making definite recommendations as to gradation of fine and course aggregates to be used in road construction. Producers should keep abreast of what is being done in this respect and should be prepared to have engineers and architects fully informed in regard to the quality and preparation of their materials to the end that there may be no hasty or unwarranted preclusions, but rather that conclusions may be beneficial to the industry."

General Car Shortage Feared

Agricultural Limestone Manufacturers Appeal to Secretary of Agriculture to Avert Car Shortage—Ben Stone Comments on Illinois Situation

THE following letter was sent by A. P. Sandles, Secretary of the National Crushed Stone Association to Hon. D. T. Houston, Secretary of Agriculture, Washington, D. C., in regard to the much-feared car shortage. This question is of vital importance and any having influence should lend a helping hand:

"Some of our manufacturers of agricultural limestone are fearful that cars will not be available for limestone shipments during the rush season of August and September.

"They report to me that many cars are crippled and unusable; that railroad men advise them that many engines are in bad condition.

"High cost of living makes food production a most serious question. All signs indicate a big sale and shipment of agricultural limestone if cars can be had.

"Our members have asked me to request your helping hand in urging the United States Railroad Administration to be prepared to take care of this business with as few handicaps as possible.

"The industry will appreciate your interest in this matter."

Illinois sand and gravel producers are at present facing a very similar problem due to the fact that open-top cars in the Peoria district, Illinois, are being used for movement of coal almost to the exclusion of sand and gravel. The following comment was made by Ben Stone, Business Director of the Illinois Sand & Gravel Producers' Association:

"Several members of this association have already felt the effect of car shortage resulting from an increased demand for open-top cars for coal. With a view to averting as far as possible serious consequences, we have today addressed a letter to Regional Director Holden, demanding that sand and gravel be given equal consideration with coal in the furnishing of equipment during the remainder of this year. Some of our members are more fortunately located in this respect than others, and may not experience a great deal of difficulty of this nature. It is a feature that should be watched very closely, however. Every producer should do everything he can to increase car efficiency. Don't order more cars than you will need or know you can load on any one day; load every car up to ten per cent above the carrying capacity; see that your plant superintendent understands the importance of loading cars promptly; insist that they be moved promptly and impress upon your customers the importance of having cars unloaded immediately after delivery; don't intentionally misuse equipment under any circumstances. All of these things will help. If you will report to this office any failure of carriers to furnish empty cars or move loaded cars with reasonable regularity we will be glad to do whatever we can to assist in having the proper remedy applied."

New Method in Making of Concrete Blocks and New Style Brick

INDIANAPOLIS, IND.—New methods in the manufacture of cement building blocks have been perfected by C. E. Phillips, an Indianapolis man, who has recently returned to civil life after overseas service.

The concern, of which he is the head, the American Brick-o-Block Co., is placing on the market machines manufactured under patents granted to his father, the late C. E. Phillips, Sr., and is preparing to erect a building to manufacture the new-style blocks, where supplies of sand and gravel are available.

The novelty in the blocks is that instead of the old-style imitation of cut or chipped stone, these blocks are cast to imitate brick with sunken grooves to simulate raked mortar joints. In addition to this change in design, the blocks are made to imitate in color and texture rough shale brick, as well as sand-finish buff or red brick. Some of these are already in use in foundations, porches and mantels in this city. The fact that they can be produced at about half the cost of the brick which they imitate is of interest to homebuilders, says Mr. Phillips.

Permit for Sand and Gravel Protected in Texas

WHEN MERRILL & MERRILL, sand and gravel contractors, did not pay June taxes of $1,500, an attempt was made to revoke their permit for removing sand from the San Jacinto River to be used in the construction of the Galveston County, Texas, causeway. According to the Galveston News this order has been temporarily restrained pending an investigation to ascertain whether the Texas law taxes sand and gravel taken from streams for the construction of public highways.

It is claimed by County Attorney C. Theobald that Texas law does not tax sand and gravel taken from streams for highway construction. Merrill & Merrill are willing to furnish bond to insure the payment of the tax in case it should be decided by the courts that this tax should be paid, and that the contractors are solvent and able to pay.

New Potash Field Discovered in Pennsylvania

POTASH bearing rock has been discovered in Tioga County, Pennsylvania, in large quantities, according to numerous newspaper reports.

Announcement of the discovery was made by Col. H. C. Demming, state geologist.

The discovery was made along Long Run creek, in the mountains of Clymer and Gaines townships, east of Davis Station, but was not announced until after experts in mineralogy, chemistry and geology had made certain that it existed in commercial quantities.

Specimens were sent to various colleges for analysis, among them the New York State School of Agriculture, Cornell University, and a college in Wisconsin, with favorable reports from all.

Analysis has shown the rock to vary between 3 per cent and 44.8 per cent potash salts, it is claimed.

Lime for Water Purification Was Excluded from St. Louis Freight Embargo

ST. LOUIS CAME within twenty-four hours of being without water when the Missouri Pacific Railroad placed an embargo on all freight shipments August 6th, on account of the shopmen's strike on that road. The Missouri Pacific has been hauling two carloads of lime to St. Louis every day, where it is used in purifying the water. Water Commissioner Wall found the supply on hand was sufficient for only three days and that it would cost four times as much to have the lime delivered by motor truck. The situation was then explained to the railroad officials and their promise was obtained that the embargo would not interfere with the lime shipments.

Would Tax Importations of Canadian Lime

WASHINGTON, D. C.—Considerable interest, particularly among lime manufacturers, now centers about the bill recently introduced in Congress for the purpose of repealing the so-called Canadian Reciprocity Act. Under the terms of this act, many commodities are imported from Canada tax free, while others are admitted into each country from the other at identical rates and other articles are included upon which we make a more favorable rate of duty to Canada than to other countries.

The Canadian reciprocity agreement was negotiated at Washington during the month of January, 1911, between representatives of the American and Canadian governments. The arrangement was to take the form of concurrent legislation instead of a treaty, for the reason that it was said Canada wished to be free to annul it at any time if it should prove to be against her interests. Bills were introduced simultaneously in Congress and the Canadian Parliament for this purpose. Both bills met with opposition, but while Congress was successful in passing the American bill, the Canadian Parliament refused to pass its measure, even though it was conclusively shown that the arrangement was far more favorable to Canada than to the United States. As a result, we have an agreement with Canada favoring that country, while Canada has none with us.

Under Schedule A of the agreement, embracing the articles which were to be duty free in both countries, were included manufactured asbestos, gypsum, talc, mica, feldspar and fluorspar. Schedule B, articles to be admitted into each country from the other at identical rates of duty, included monumental and building stone, except marble and onyx. Schedule D contained seven articles upon which special rates of duty were to be made by Canada and included cement and lime.

E. C. Potter Leaves Biesanz Stone Co.

E. C. POTTER has disposed of his interests and resigned as secretary and director of the Biesanz Stone Co., of Winona, Minn., and also as secretary of the Wisconsin Sand and Gravel Co., of Milwaukee, Wis. He has been actively interested in the Biesanz Stone Co. since 1908, when that concern first started in the washed and screened sand and gravel business, and also in the Wisconsin Sand and Gravel Co. since that corporation was organized in 1915.

Mr. Potter has put a great deal of his efforts into working out a proper system of accounting for sand and gravel plants and systematizing of the business in general. All of the blanks and forms in use by both corporations were worked out and prepared by him so that the system would fit into and provide adequately for any and all conditions which the sand and gravel business requires.

E. C. Potter

Mr. Potter is also thoroughly familiar and experienced with the plant operation. He has had a wide experience in the washed and screened sand and gravel industry, and although he has not made any plans to locate in the sand and gravel business for the immediate future, he states that there is no other line of business which appeals to him nearly as much as does the sand and gravel line, and after taking a much needed vacation he expects to locate at some desirable place with an up-to-date washed sand and gravel plant.

Cement Prices Investigation

ANNOUNCEMENT has come from Washington that the Government has begun suit to dissolve an alleged cement manufacturers' combine in the East.

Shortage of Railway Cars Is Inevitable

THE STRIKES of railway shopmen throughout the country have made the car shortage problem acute. The depreciation of equipment since the government took over the operation of the roads has made the situation bad enough, but there is every indication now that just as the demands upon the rock products industries are reaching a maximum, there will be far less cars than necessary to handle the business.

Box cars will now be demanded for grain and gondola cars for coal. The situation regarding box cars is particularly acute. The Lime Association reports:

"Early in July the weekly letter called the attention of the lime industry to the impending shortage in cars that was sure to result from the movement of large grain crops. The movement of grain is under way and the effect is already apparent in western districts showing itself in a serious car shortage complained of by a number of shippers in that part of the country.

"The railroad equipment during the war has been worked to the limit of its capacity. Rolling stock is in none too good condition and while in most cases the regional directors are very anxious to assist the shippers in their regions, the character of the cars being furnished is not in all cases suitable for lime shipment.

"Some manufacturers have been forced to ship lime in cattle cars and other unsuitable rolling stock and have been forced to line these cars with tar paper and otherwise to protect the perishable contents.

"Other industries than the lime industry are affected in a similar manner and it is to be hoped that every lime manufacturer throughout the country will endeavor to go as far as he can towards helping the railroad situation by rejecting as few cars as possible on the grounds of their not being tight and loading such cars as he does receive as fully as circumstances will permit.

"We are receiving daily requests to use our influence with the Car Service Section of the Railroad Administration in an effort to secure relief for our members. These calls for assistance have been immediately responded to. We have taken up the cases vigorously and the results have been most gratifying.

"The Car Service Section of the Railroad Administration has consistently shown a disposition to do all in its power to co-operate with us and to go as far as it can in satisfying the public in the face of a very real lack of equipment."

Glass and Glass Sand Industries Abroad Reviewed

American Manufacturers Will Probably Have Plenty of Competition

By R. B. Ladoo
U. S. Bureau of Mines

A LARGE GLASS PLANT for the manufacture of bottles, table and illuminating glassware has recently been erected at Havana, Cuba. This is the first plant of its kind in Cuba, and the outlook for its success seems promising. One of the factors most favorable to the establishment of the glass industry in Cuba is the supply of raw materials available on the island. This new company controls about 3,000 acres of glass sand, with an average content of 99.43 per cent silica, and has ample resources of high grade limestone.

Machinery and supplies are being purchased in the United States, and arrangements are being made for the importation of a number of experienced glass workers.

In the Philippines

With the largely increased demands and high prices for glassware in the Philippines, the problem of the manufacture of glass locally is being studied by the Philippine Bureau of Science. Conditions seem to be favorable in that raw materials of good quality occur in abundance. A very good grade of white silica sand and vein quartz occur in large quantities in the island of Lubang, near Mindoro. Limestone is found in large quantities in Binangonan, Montalban and other localities. Sodium carbonate at present is imported, but might be produced locally if modern methods of salt manufacture were to replace the native methods now in use. Manganese dioxide is now being produced at Ilocos Norte. The problems would seem to be those of transportation of raw material, training of workmen, and importation of glass making machinery and refractories.

Germany

According to recent reports, the glass industries of Germany will not be able to seek export trade, or compete in the world's markets for some time to come. First, the heavy war demands for glass, together with the curtailment of production have made impossible the building up of stocks of glass. Second, large domestic needs must be supplied. Third, the shortage of coal in Germany is so acute that most of the glass plants have been compelled to shut down, or run with a very restricted output. Fourth, costs of production and therefore prices have increased so greatly that it is doubtful if German glass could compete with American-made glass. These fundamental reasons, together with the natural prejudice against all German made goods makes the much feared dumping of German glass very improbable.

Canada

Glass manufacturers in Canada have been largely dependent in the past upon the United States for their supplies of glass sand and sodium carbonate. However, the new plant of The Brunner-Mond Company, at Amherstburg, Ontario, Canada, at which sodium carbonate is to be made by the Solvay process, is expected to supply all of Canada's needs for soda ash. The capacity of this plant is reported to be about 120 tons per day. Some glass sand is being secured from Oneida, Ontario, but it is said to be of an inferior grade, and only suitable for the manufacture of the cheaper grades of glassware.

Steel Barrels for Lime

THE STEEL CONTAINER is destined to take out of the lime business the "rush season." With this container it will be possible for the manufacturer to burn lime at a constant economic rate of production and in those periods when the orders for material fall off he can store up a surplus with which to take care of the rush when it comes again. The customer also will be able to take supplies that will tide him over any unavoidable transportation delays that may occur.—General Manager Hall of the Lime Association.

Indiana Crushed Stone Secretary Active

THE SECRETARY of the Indiana Crushed Stone Association, Fred W. Connell, is not letting any grass grow under his feet in the state campaign for hard roads. Mr. Connell is taking an active part in preparations for annual convention of the County Commissioners' Association of Indiana at Indianapolis, September 24, 25 and 26.

Good roads will be the chief topic of discussion at this convention.

Mr. Connell is Treasurer of the County Commissioners' Association, chairman of their finance committee and a member of the speakers' committee.

National Strike Threatened in Building Trades

NEW YORK—Representatives of 21 international building trades unions affiliated with the American Federation of Labor at a meeting here today laid plans for calling a nation-wide strike unless dual recognition of plasterers in New York City was ended, according to Peter G. Cook, vice-president of the building trades department of the Federation of Labor, says the Chicago Tribune.

Harmony in Lime Association

Directors' Meeting in Atlantic City Turns Out to Be a Small Convention of Boosters for National Organization

IF THE MAJORITY RULES, the Lime Association will come out of its October reorganization meeting bigger and stronger than ever, according to all present indications.

The board of directors of the Association met in Atlantic City, August 1, to arrange for the proposed changes in the organization which will be submitted to the entire membership in a general meeting to be held in the city of Washington, October 1. The great interest of the members of the Association was evidenced by the fact that with a single exception the entire membership of the board of directors was present, and in addition 34 other lime manufacturers came to express their views.

A committee of five of the directors was appointed to formulate such changes in the constitution and by-laws of the Association as may be necessary for its future welfare. This committee is comprised of the following gentlemen: John A. Kling, chairman (president of the Kelley Island Lime & Transport Co., Cleveland, Ohio); Wm. E. Carson (president of the Association and of the Riverton Lime Co., Riverton, Va.); B. L. McNulty (general manager of the Mitchell Lime Co., Chicago, Ill.); Charles Warner (president of the Charles Warner Co., Wilmington, Del.); and George B. Wood (president of the Rockland & Rockport Lime Co., Rockland, Me.)

The sentiment of the entire membership outside of the Eastern Coast States is very strong for the organization of the Association as it now exists, with the possible exception of a change in the method of electing the directors.

Supporters of Federal Highway Commission Active

Townsend Bill Now Advocated as Co-operative

WASHINGTON, D. C.—The movement to construct a national system of trunk line highways intersecting each state, the cost of construction and maintenance to be borne by the Federal government, is gaining throughout the country, acording to reports coming into the Federal Highway Council.

Many letters are coming in from practically all sections endorsing the movement and calling for explicit information as to the main points in the national highway measure, now pending in the senate. It is expected to come up for further consideration at an early day.

The national highway bill, introduced by Senator Townsend, chairman of the senate committee on postoffices and post roads, is an entirely new piece of legislation. Its object is to build in each state, trunk line highways to the extent of not less than two per cent nor more than five per cent of the total mileage of the state, and to join them with the main trunk lines of other states, thus creating a national system connecting the entire country.

The decided trend in public opinion in favor of Federal construction of a national highway system is due, according to those having the measure in charge, to the fact that such mileage as each state will receive will put the state that much nearer to a complete and well connected state system, at the same time insuring logical connections with adjoining states. It is admitted that such connections are necessary to a properly coordinated system and that such coordination is logically a federal function.

The net result to each state, it now begins to appear, will be a strengthening of forces behind road development. The states on the one hand are to be aided by being relieved permanently of the construction and maintenance of the heaviest traveled inter-state routes, thus permitting the concentration of state effort on routes having their terminal points within the state. In other words, more effective co-operation of federal and state power is to be gained by each having its specific work laid out, one applying its efforts to national connections and the other to the development of local or intra-state roads and their proper connections.

Supporters of the national highway movement are increasing their activities in the expressed belief that in the pending measure they are working for a plan whereby a comprehensive system of national highways may be constructed and put into permanent operation within the next few years, and at less cost to the public than under any other plan.

Railroad Situation Forces Building Material Prices Up

NEW YORK—Building material distributors, fearing railroad embargoes, found producers handicapped when they sought to accumulate stocks last week, according to The Dow Service Daily Building Reports today.

Barely one week sufficed to change a condition of comparative stability in building material prices to one characteristic of a stampede.

The parting point between the building artisan and his job has almost been reached. With schedules now proposed by labor leaders in effect the cost for a frame and stucco dwelling house, already advanced 48 per cent between May 1915 and June of this year, will have climbed to 79 per cent; the cost of a steel skeleton building will show an increase of 105 per cent instead of 84 and the cost of a reinforced concrete building instead of showing an advance of 80 per cent will cost 97 per cent more. Such advances as these, indicating a gain in cost of construction of from 25 to 40 per cent within two months, with no assurance that the cost will hold even there when the question of supply and demand enters into the building material market, are not conducive to free building conditions.

The price peak of building materials is still afar off. The solution of the labor wage scale problem is only part of the conditions that will make for higher construction costs next year.

East Seeks Basis of Agreement for Labor and Employers

If Prices Become Fixed Long Enough to Allow Contractors to Estimate, the East Expects Big Building Era

STRONG PRESSURE is being brought to bear upon the entire eastern building construction industry to reach a basis of agreement between labor and employers so that construction, now that material prices are practically stabilized, may proceed with some semblance of freedom, says The Dow Service Daily Building Reports.

The volume of building construction easily could be between 60 and 70 per cent of a pre-war normal year if skilled building labor and employers could effect a maximum wage scale for all trades for a definite period into the future. Building construction is being retarded now mainly because responsible contractors are not inclined to freely figure prospective work. They will adhere to this policy so long as there is no certainty as to how long wage scales will remain at a given level. The point in issue will probably be developed this week, if recourse is taken to a lockout to bring the issue to a point.

Economists entering into the cost of living and cost of construction of buildings concur in the belief that the high level has been touched or is almost within touching distance. The best minds in the building material producing and distributing markets admit that the top has been reached, except in so far as the cost of labor ascends and, perhaps, also, the impending advances in freight rates.

The Dow Service Daily Building Reports does not believe that the high price peak of building materials has been reached, however. Price advances up to the present time have been attributable largely to increased cost of wages. The element of supply and demand for these finished building materials has not been noticeably operative in any line, with the exception of Portland cement, sand, crushed stone, gravel, lumber and one or two specialties. Once a standard of wage scale is fixed for a term sufficiently long to enable contractors to figure the vast volume of building work they are asked to estimate on there will be such a call for building materials from consuming sources as to force prices much higher. If labor would wait for that time to come before asking for wage increases in such quick succession that manufacturers or contractors cannot adjust their figures before another wage boost is demanded: both invested capital and labor would enjoy the fruits of a nation-wide era of building operations that without question will pass beyond all imagined bounds.

NEW MACHINERY AND EQUIPMENT

Operating Experience With the Largest Revolving Steam Shovels

By J. N. Gawthrop, Jr., Northern Sales Manager Bucyrus Co., Minneapolis, Minn.

THE SO-CALLED 300-ton shovel, so commonly employed for coal stripping in certain coal properties of Kansas, Indiana, Illinois, Alabama, Ohio and Oklahoma, has found its place of like usefulness on the iron ore ranges of Minnesota and Michigan.

It is probably only a question of a short time before sand, gravel and quarry plan operators will investigate its merits as a labor saver in their work. Indeed, the Chicago Gravel Co. adopted a shovel of this type, but of somewhat smaller size, three or four years ago, for excavating its Joliet pit. (See ROCK PRODUCTS, February 13, 1918.)

Butler Brothers, the large stripping contracting and mining company of St. Paul, Minn., who have been the originators of so many of the present methods used in the open pit mines of the Lake Superior district were the first to use the large revolving shovel in their work.

Butler Brothers took a contract for stripping the Wakefield Iron Co.'s property at Wakefield, Mich. They used for this work several so-called 100-ton shovels of the standard or non-revolving railroad type. The over-burden of the Wakefield property consisted of alluvial drift of a particularly slippery nature. After encountering frequent slides, causing wreckage of dump and shovel tracks, Butler Brothers finished their stripping contract.

Sometime thereafter they were awarded contract for stripping the Plymouth mine at Verona, Mich., then belonging to Coates & Tweed of Duluth. The Plymouth mine immediately adjoins the Wakefield open pit mine. The overburden was practically identical to that of the Wakefield mine and a means of removing it was looked for, whereby the trouble with slides would be lessened or eliminated. Also it was desired to find a means of stripping iron ore which would reduce the existing cost of track work. This resulted in the use of the first 300-ton shovel in the Lake Superior iron-ore district.

A 225-B Bucyrus shovel was purchased. This machine carried a 6-cu. yd. struck measure dipper, 80-ft. boom and 58-ft. dipper handle, having a lift of 61 ft. under the open door of dipper and a reach of 94 ft. 6 in. radius with boom at angle of 45 degrees. The working weight of this shovel so equipped is 327 tons.

The first cut across the Plymouth mine property was laid out perpendicular to the adjoining Wakefield pit. The overburden of this first cut ran from 43 to 75 ft. in depth. A pilot cut sufficiently wide at the bottom to allow for standard-gauge track was constructed along one side of this first cut to give a dump track 45 ft. above the top of ore. This dump track cut was made by a 100-ton shovel and a small revolving shovel. Permission was granted by the Wakefield company to erect the large shovel on top

Bucyrus 225-B revolving shovel, Oliver Iron Mining Co., stripping ore property at Missabe Mountain, Virginia, Minnesota

of their ore body, which had not been mined, adjacent to where the first Plymouth mine cut was to start.

Immediately after erection on top of the ore body the big shovel started to take out the first cut loading into 20-cu. yd. Western air dump cars running on the before-mentioned dump track 45 ft. above the shovel track.

When the first cut was completed clear across the property uncovering a strip of ore about 110 ft. wide, the shovel returned, taking out the second cut and loading onto second dump track that had been constructed similar to the first, beyond and parallel to the second cut.

Butler Brothers started stripping with the big shovel about the first of December, 1915, and by the end of shipping season the following year over 300,000 tons of ore had been mined from this property, which less than a year before had not been touched. This was a record never before attained.

The 225-B Bucyrus shovel, when overtasting in the coal fields, has a speed of approximately two full cycles per minute. When loading into cars this same machine has an average speed of one cycle in 45 seconds. The 100-ton non-revolving shovel averages about 23 seconds per cycle when loading cars. The big shovel carries a dipper of twice the capacity of the 100-ton machine and has one-half the speed of this machine, so no great difference in yardage removed per month was expected. As a matter of fact, it has been demonstrated that the large shovel can strip an amount of overburden greatly in excess of the 100-ton machine. This is partly due to the fact that less frequent moves of the big machine are required and delays caused by moving back are eliminated and delays by frequent shifting of dump track are reduced to a minimum when the large revolving shovel is employed.

The greatest saving in the use of this large revolving shovel in stripping work on the iron ranges has been in the reducing of track laying and shifting work. In one instance the cost of stripping a certain property was figured using one 100-ton type shovel and using one 300-ton shovel, respectively. With the small shovel it was estimated 75 men would be required per day of two ten-hour shifts and with the large machine an average of 45 men would do the work. The difference was entirely due to the saving in the required track work. Needless to say in this particular job the big machine was employed.

These large machines are also used in the actual mining of the ore. In some strip mines the quality of ore varies vertically. The big shovel, being able to take out a very much higher face of ore than the smaller machine, can automatically get the right mixture in one cut, while to accomplish this result with the non-revolving smaller machine several machines working on different levels would have to be employed.

There are now eleven of these 300-ton machines employed on the Gogebic and Mesabi Ranges and many new projects are being planned where other machines of this size will be used.

Producers and Manufacturers of Soapstone Organize

A MEETING of all talc and soapstone producers and manufacturers was called for Tuesday, August 12, 1919, 11 a. m., at the headquarters of The American Protective Tariff League, 339 Broadway, New York, N. Y. The purpose of this meeting was to consider the formation of an association of talc and soapstone producers, and to discuss the possibilities of obtaining tariff legislation to protect the domestic talc industry.

A large and representative attendance was at the meeting.

Bucyrus 225-B revolving shovel, loading ore, Plymouth Mine, Verona, Mich.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton. F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Akron, N. Y.	.60	.60	1.00	1.00	1.00	1.00‖
Auburn and Syracuse, N. Y.	.80	1.20	1.20	1.20	1.20	1.20
			Railroad ballast, 1.00			
Buffalo, N. Y.			1.00@1.10 per ton, all sizes			
Burlington, Vt.	1.50		3.00	1.75	1.75	
Chaumont, N. Y.		1.75	1.65	1.35	1.25	1.25
Coldwater, N. Y.			Flux, 1.50@2.10			
Grove, Md.	.75	1.85	1.65	1.50	1.25	1.10
North LeRoy, N. Y.	1.00	1.00	.75	1.00	1.00	1.00‖
Walford, Pa.	1.25	1.40	1.50	1.50	1.50	1.50
CENTRAL:						
Alden, Ia.	.40		1.00	1.00	1.00	
Alton, Ill.	1.80		1.50	1.40		
Anna, Ill.			1.00@1.25 for prepared sizes			
Belvidere, Ill.			1.00 for any size produced			
Brillion and Sherwood, Wis.	.90@1.00		1.00	1.00		1.00
Davenport, Ia.	1.40	1.30	1.30	1.20	1.20	1.20
Dundas, Ont.	.65	1.05	1.05	1.05	.85	.85
Eden and Knowles, Wis.	.80@1.00	.80	1.00	1.00	1.00	1.00
Elmhurst, Ill.	.85	1.00	1.00	.85	.85	.85
Greencastle, Ind.	1.00@1.25	1.10	1.00	.90	.90	.90
Illinois, Southern	1.50	1.25	1.25	1.25	1.10	
Kokomo, Ind.			.90@1.00 all sizes			
Lannon, Wis.			1.00 all sizes			
Lewisburg, O.	.80@1.00		1.00@1.10	1.00@1.10	1.00@1.10	1.00@1.10
Mankato, Minn.			(1-in. 1.50)	(2-in. 1.25)		
Mayville, Wis.	.75	.75@ .90	1.00	1.00	1.00	1.00
McCook, Ill.	.90@1.10	1.50	.80@1.00	.70@ .85	.70@ .80	.70@ .80
Oshkosh, Wis.			1.00 in all sizes, Blue Limestone			
River Rouge, Mich.	.80@ .85	1.15	1.15	1.15	1.15	1.15
Sheboygan, Wis.			1.00@1.10 for all sizes			
Stone City, Ia.	.50		(1-in. 1.40)	1.30	1.20	
Toronto, Can.	1.55	1.95	1.95	1.95	1.75	1.75
			These prices include 90c freight			
SOUTHERN:						
Brooksville, Fla.	1.00			2.50		
Cartersville, Ga.		1.60	1.60	1.50	1.50	
Fort Springs, W. Va.	1.00	1.20	1.40	1.60	1.40	
Hopkinsville, Ky.	1.10			1.00	1.00	
Mascot, Tenn.		1.00@1.25				
Memphis Junction, Ky.			Average 1.10			
Winnfield, La.	1.00	1.60	1.60	1.60	1.60	1.75
WESTERN:						
Atchison, Kans.	.50	1.80	1.80	1.80	1.70	1.70
			Rip-Rap, 1.30			
Blue Springs and Wymore, Neb.	.15	1.55	1.55	1.45@1.50	1.35@1.40	1.30
Buffalo, Ia.	.70	1.10	1.05	1.00	1.00	
Davenport, Ia.	1.50*	1.50*	1.50*	1.50*		
El Paso, Tex.			1.00 for all sizes			
Kansas City, Mo.	.60	1.35				
New Braunfels, Tex.	.60	1.25@1.50	1.00@1.30	1.00@1.25	.90@1.10	

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Bernardsville, N. J.		2.90*	2.50*	2.15*		1.60
Birdsboro, Pa.	1.25	1.80	1.70	1.60	1.50	1.25
Branford, Conn.	.80	1.50	1.50	1.20	1.10	
Castro Pt., Richmond, Cal.	.50*		1.50*	1.40*	1.40*	
Duluth, Minn.	.50@.65	1.50	1.35	1.15	1.15	1.00
Farmington, Conn.		1.05	1.05	1.05	.95	
Glen Mills, Pa.	1.00	1.35	1.70	1.55	1.35	1.40‖
Millington, N. J.	1.80	1.80	1.80	1.60	1.40	
New Britain, Conn.	.75	1.20	1.15	1.10	1.00	
Oakland, Calif.		1.75*	1.75*	1.75*	1.75*	
Rock Hill, Pa.	1.00	1.35	1.70	1.55	1.35	1.35‖
Winchester, Mass.	.75	.75	1.60	1.45	1.25	1.25‖

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Atlanta, Ga.—Granite	1.60		2.85	2.35	2.35	
Fair Oaks, Calif.—Cr. Bldrs.	.85	1.05	.95	.85	.85	
Hendlers, Pa.—Quartzite	.80	1.00	1.25	1.00	1.00	1.00‖
Little Falls, N. Y.—Syenite	.80	1.20	1.40	1.20	1.20	1.20‖
Middlebrook, Mo.—Granite	3.50		1.75	1.75		1.00‡
Roseburg, Ore.		1.50	1.25	1.05	1.00	1.00
Smith Siding, Richmond, Va.—Granite	1.25		1.50	1.50	1.50	
Stockbridge, Ga.—Granite	.50	2.00	1.90	1.75	1.75	
White Haven, Pa.—Sandstone	.85	1.20	1.40	1.20	1.20	1.20‖

*Cubic yard. †Agrl. lime. ‖R. R. ballast. §Flux. ‡Rip-rap. a 3-inch and less.

Agricultural Limestone Wholesale at Plant, per Ton

EASTERN:

Coldwater, near Rochester, N. Y.—Analysis: $CaCo_3$, 56.77%; $MgCo_3$, 41.74%—80% thru 100 mesh; ppr., 4.50; bulk 3.00

Chaumont, N. Y.—Analysis: $CaCo_3$, 92 to 98%; $MgCo_3$, 1.51%—(Thru 100 mesh); ppr., 4.00; bulk 2.50
Paper bags 4.00

Cobleskill, N. Y.—Ppr., 5.00; bulk 3.00

Grove City, Pa.—Analysis: $CaCo_3$, 94.75%; $MgCo_3$, 1.20%—(70% thru 100 mesh); 80 lb. ppr., 4.60; bulk 3.25

Grove, Md.—90% thru 4 mesh; bulk 3.00

Hillsville, Pa.—Analysis, $CaCo_3$, 85%; $MgCo_3$, 1½%—(70% thru 100 mesh) in 80 lb. ppr. bags, 4.25; bulk 2.75

Jamesville, N. Y.—68% thru 100 mesh; 95% thru 50; 100% thru 20. Sacks, 3.75; bulk 2.25

Lime Kiln, Md.—50% thru 50 mesh; bulk 4.00

Pownal, Vt.—(50% thru 100) Analysis, $CaCo_3$, 90%; $MgCo_3$, 5%; ppr., $4.50; bulk 2.75

Walford, Pa.—(70% thru 100 mesh; 85% thru 50; 50% thru 50; 100% thru 4); sacked, 4.25; bulk 2.75

West Stockbridge, Mass. — Analysis: Combined carbonate, 95%—33% thru 200 mesh; 66% thru 100; 100% thru 40. Bulk 2.85

CENTRAL:

Alton, Ill.—Analysis: $CaCo_3$, 96%; $MgCo_3$, 0.75%—90% thru 100 mesh 3.00
50% thru 50 mesh 2.00

Anna, Ill.—Ground; bulk 1.25

Bedford, Ind.—(90% thru 10 mesh) Analysis, $CaCo_3$, 98.5%; $MgCo_3$, 0.5% 1.75

Belleville, Ont.—50% thru 100 mesh 2.50

Canton, O.—100% thru 10 mesh; 49% thru 100; 59% thru 50 ..... 3.00
80 lb. bags 4.80

Chicago, Ill.—Analysis, $CaCo_3$, 53.63%; $MgCo_3$, 37.51%—90% thru 50 mesh 1.00

Columbia, Ill., near East St. Louis —(¼" down) ..... 1.25@1.80

Ellettsville, Ind.—Analysis, Carbonate, 98% 2.00

Elmhurst, Ill. — (Analysis, $CaCo_3$, 35.73%; $MgCo_3$, 20.69%) 50% thru 50 mesh 1.25

Greencastle, Ind.—(Analysis, $CaCo_3$, 98%) 50% thru 50 mesh 1.75

Howenstein, O.—100% thru 10 mesh; 59% thru 50; 39% thru 100 ..... 2.75@3.00

Lannon, Wis.—(90% thru 50 mesh) Analysis, 54%, $CaCo_3$; 44%, $MgCo_3$ 2.00

Marble Cliff, O.—(50% thru 100 mesh) Analysis, $CaCo_3$, 86%; $MgCo_3$, 8% 3.00

Marblehead, O. — (Analysis: $CaCo_3$, 95.33%) 50% thru 100 mesh ..... 3.00@4.50

McCook, Ill.—Analysis, $CaCo_3$, 54.10%; $MgCo_3$, 45.04% — 100% thru ¼" sieve; 78.12% thru No. 10; 53.29% thru No. 20; 38.14% thru No. 30; 26.04% thru No. 50; 16.27% thru 100 ..... .90@1.00

Milltown, Ind.—Analysis, $CaCo_3$, 94%; $MgCo_3$, 3% 1.50

Montrose, Ia.—(90% thru 100 mesh) .. 1.25@1.35

Muskegon, Mich.—(90% thru 50 mesh) Analysis, $CaCo_3$, 53.35%; $MgCo_3$, 43.27% 2.50

Piqua, O.—Analysis: $CaCo_3$, 82.8%; $MgCo_3$, 8.2%; neutralizing power in terms of calcium carbonate, 95.3%—70% thru 100 mesh, bulk ..... 2.50@4.00

Rockford, Ill. — Analysis, $CaCo_3$, 53.75%; $MgCo_3$, 44.35% 1.25

(Continued on next page.)

Agricultural Limestone Wholesale at Plant, per Ton

(Continued from preceding page.)

Stolle, Ill. (near East St. Louis on I. C. R. R.)—(Thru ⅛" mesh) Analysis, $CaCo_3$, 89.61 to 89.91%; $MgCo_3$, 3.82%	1.50
Stone City, Ia.—(90% thru 50 mesh) Analysis, $CaCo_3$, 98%	.50
Toledo, O.—Analysis, $CaCo_3$, 52.72%; $MgCo_3$, 43%—(20% thru 100 mesh; 30% thru 50; 80% thru 100; 100% thru 5/32 screen)	1.80
Whitehill, Ill. — Analysis, $CaCo_3$, 96.12%; $MgCo_3$, 2.50%—	
50% thru 50 mesh, bulk	1.50
90% thru 100 mesh	5.00
SOUTHERN:	
Dittlinger, Tex. — Analysis, $CaCo_3$, 99.09%; $MgCo_3$, .04%.	
90% thru 100 mesh	2.00
90% thru 4 mesh	1.00
Grovania, Ga.—Analysis, $CaCo_3$, 95%; $MgCo_3$, none—50% thru 100 mesh	2.50
Hopkinsville, Ky.—Analysis, 94.6 to 98.1% $CaCo_3$—Bulk	2.00
Memphis Jct., Ky.—(Analysis, $CaCo_3$, 95.31%; $MgCo_3$, 1.12%) average price	2.00
Ladds, Ga. — Analysis: 96 to 98% combined carbonates—All thru 10 mesh with all dust in	2.50
Mascot, Tenn.—Analysis, $CaCo_3$, 52%; $MgCo_3$, 38%.	
(80% thru 100 mesh)	2.50
(All thru 10 mesh)	2.00
Paper bags, $1.50 extra per ton; burlap, 2.00 extra per ton.	
Tyrone, Ky.—Analysis, $CaCo_3$, 93%; $MgCo_3$, 6%—90% thru 4 mesh	2.25
Winnfield, La.—(90% thru 50 mesh)	3.00
WESTERN:	
Fresno, Calif.—(Analysis, $CaCo_3$, 94%; $MgCo_3$, .02%) 50% thru 200 mesh; 90% thru 100; 100% thru 40. Prices for delivery: Sacks, 6.50; bulk Sacks, 10c each.	6.00
Kansas City, Mo., Corrigan Sid'g—50% thru 50 mesh; bulk	1.50

Miscellaneous Sands per Ton at Plant

Silica sand is quoted washed, dried and screened, unless otherwise stated.

GLASS SAND:	
Berkeley Springs, W. Va.	2.00@2.10
Special hand selected rock	2.50
Cedarville and South Vineland, N. J.—	
Glass, damp	2.00
Glass, dry	2.50
Gray Summit, Mo.	2.00@2.50
Guion, Ark—Glass on contracts	1.50
Hancock, Md.—Engine and glass	2.50@3.00
Klondike and Pacific, Mo.:	
Contracts	2.00
Car lots	2.50
Mapleton, Pa.	2.50
Glass, damp	2.00@2.25
Massillon, Ohio	3.00
Michigan City, Ind.	.40
Millington, Ill.	1.75
Mineral Ridge, O.	2.75
Montoursville, Pa.—Green, washed	2.00@2.75
Ottawa, Ill.	2.00
Large contracts	1.75
Robinson, Md., washed, screened, not dried	2.00
Sands, Elk Co., Pa.—Selected, green	2.50
Thayer, W. Va.—Washed	2.25
Not washed	2.00
FOUNDRY SAND:	
Albany, N. Y., at plant—Core	1.25@2.25
Molding, fine and coarse	1.65@2.00
Sand blast sand	1.50@3.00
Brass molding	1.65@2.00
Allentown, Pa.—Core	1.25@1.50
Arenzville, Ill.—Molding fine	1.50
Berkeley Springs, W. Va.—Roofing	2.00
Bowmanstown, Pa.—Core	1.25
Molding fine or coarse	1.50
Roofing pebble	3.00
Cedarville and So. Vineland, N. J.—	
Core, damp	2.00
Core, dry	2.50

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Gravel, 2 inch and less
EASTERN:						
Attica, N. Y.	.60	.60	.60	.75	.75	.75
Boston, Mass. (On Docks)	1.25	1.00	1.75	1.70	1.60	1.60
Buffalo, N. Y. (Niagara River)	.80	.80	.75	.75	.75	.75
Farmingdale, N. J.		.43	1.25		1.05	
Morristown, N. J.	.60	.60	1.20	1.00	1.00	
Pittsburgh, Pa.		.90@1.00		.90@1.00	.70@ .80	.70@ .80
Washington, D. C.—Wharves	.75	.75	2.00	1.40	1.20	1.20
West Peabody, Mass.	.35@ .45	.35@ .45	2.00	1.20	1.20	1.20
CENTRAL:						
Anson, Chippewa Co., Wis.	.50	.50	1.00	.25@1.00	.85	.85
Attica, Covington, Silverwood, Ind., Palestine, Ill.	.75	.75	.75	.75	.75	.75
Barton, Wis.	.75	.70	1.00	.70	.70	.70
Chicago		1.25@1.50	1.10@1.25	1.10@1.25	1.10@1.25	1.10@1.25
Cincinnati & Miami Grove, O.	.60@ .80	.55@ .75		.55@ .75	.55@ .75	
Columbus, O.	1.00	.65@1.00	.60@1.00	.70@1.00	.70@1.00	.65@1.00
Des Moines, Ia.	50@1.00	.50	1.50	1.50	1.25	1.25
Earlestead, near Flint, Mich.	.55@ .60	.55@ .60		.85@ .90	.75@ .80	.75@ .80
Escanaba, Mich.		.90	1.60	1.20	1.00	.90
Fort Dodge, Ia.	1.10	1.00	1.80	1.80	1.80	1.80
Fort Jefferson and Mechanicsburg, O.	.50@ .60	.50@ .60	.50@ .70	.50@ .70	.50@ .70	.50@ .70
Grand Rapids, Mich.		.65*		1.15*	1.00*	1.00*
Hersey, Mich.	.50	.50			.50@ .75	
Illinois, Northern	.50@ .60	.60@ .70	.75	.60@ .75	.60@ .75	.60@ .70
Indianapolis, Ind.		.60			.75	
Janesville, Wis.	.50	.50	.60	.60	.60	.60
Mason City, Ia.	.60	.50	1.45	1.35	1.30	1.25
		Railway ballast and road work, .40				
Milwaukee, Wis.		1.20 for all sizes				
Moline, Ill.	.60	.60@ .80	1.20	1.10	1.00	1.00
Montezuma, Covington, Ind.	.75	.75	.85	.75	.75	.75
Oxford, Mich.		.55	.90	.90	.80	.80
Rockford, Ill.		.60			.60	
Saginaw, Mich. (Includ'g frt.)	.95	.95	1.60	1.60	1.60	1.45
St. Louis, Mo.		2.20	2.20	2.20	2.00	1.75
		Mississippi sand, 1.90; Meramec river sand, 1.95				
St. Louis, Mo., F. O. B. cars	1.35	1.20	1.50	1.30		1.25
Summit Grove, Ind.	.75	.75		.75	.75	
Terre Haute, Ind.	.75	.75	.85	.75	.75	.75
Waupaca, Wis.		.35				.70
Winona, Minn.		.70	1.60	1.10	1.10	1.10
SOUTHERN:						
Knoxville, Tenn.	.85	.85		1.50	1.50	1.10
Lake Weir, Fla.	.50					
Macon, Ga.		.50@ .60				
Memphis, Tenn.	.80	.80			1.00	
New Martinsville, W. Va.	1.30	.90@1.00		1.00		.60@ .80
Roseland, La., and Condron, Miss.		.40		1.00		
Thomas, La.	.60					1.75
Waco, Texas	.80	.67				1.05
WESTERN:						
Kansas City, Mo.	.60	.60				
Lincoln, Neb. (on cars)	1.00	1.00	2.10	2.10		1.90
Pueblo, Col.	.80*	.60*			1.50*	
Roseburg, Ore.	1.50	1.00	1.25	1.00	1.00	1.00
Saratoga, San Jose, Calif.		.60@ .75	.60@ .70	.60@ .70	.60@ .70	.60@ .70
San Francisco, Calif.	1.00@1.25	1.15	1.20	1.20	1.20	1.20
Seattle, Wash.	1.25*	1.25*	1.25*	1.25*		1.25*

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Gravel, 2 inch and less
EASTERN:						
Burnside, Conn.	.80*					
Lowell Junction, Mass.	.75*	.65*@.75*	.60*			
Pittsford, N. Y.		.50@ .55			.50@ .60	
Yardville, N. J.		.50@ .75				
York, Pa.		1.00@1.10	(crushed rock sand)			
CENTRAL:						
Attica, Covington, Silverwood, Ind., Palestine, Ill.	.60	.60	.60	.60	.60	.60
Beloit, Wis.		.60			.60	
Des Moines, Ia.	Washed concrete mix., 25% gravel, .70; 50% gravel, .90					
Escanaba, Mich.		1.00 cu. yd., all sizes				
Grand Rapids, Mich.				.75*		
Gr'd Rapids, Muskegon, Mich.		.30				.40@ .50
Hersey, Mich.	.50			.50	.50	.50
Illinois, Northern						.50@ .60
Indianapolis, Ind.	Washed concrete, mix, .65					
Janesville, Wis.					.55	
Montezuma, Terre Haute, Ind.					.60	.60
Oxford, Mich.					.85	
Rockford, Ill.	Sand and Gravel mixed, .55@.65					
Saginaw, Mich. (Incldg. frt.)	1.05	1.05	1.20	1.20	1.20	1.20
Summit Grove, Ind.	.50 for all sizes					
Wabash Valley District, Ind.	.60 for all sizes					
Waupaca, Wis.						.40
Winona, Minn.	Pit run gravel under 2-in., .70					
SOUTHERN:						
Albany, Ga.	.70@1.00					
Dudley, Ky. (Crushed Sand)		.95		1.00		
Lindsay, Texas	1.25				.50	
Thomas, La.						.65@ .85
Waco, Texas						.67
WESTERN:						
Pueblo, Colo.	.60	River Run, .60 unscreened				
San Francisco, Calif.		.25 on cars at plant				
Saratoga, Jan Jose, Calif.		.60@ .75	.60@ .70	.60@ .70	.60@ .70	.60@ .70

* Cubic yard. B Bank. L Lake. || Ballast.

Crushed Slag Wholesale at Plant Per Ton

City or shipping point	Roofing	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:							
Bethlehem and Emaus, Pa.	2.50	.85	1.50	.85	.85	.85	.85
Buffalo	1.75	.85	.85	.85	.85	.85	.85
E. Canaan, Conn.	3.00	1.00	1.50	1.15	1.10	1.10	1.10
Erie, Pa.	1.75	.85@1.00	1.00@1.50		1.00	1.00	1.00
Emporium, Pa.		1.00	1.00		1.00	1.00	1.00
Ensley, Ala.	2.05	.90		.90@1.20	1.00	.90	.85
Hokendaugua and Topton, Pa.	2.50	.85	1.50	.85	.85	.85	.85
Lebanon (Donaghmore), Pa.	2.50	.85	1.50	.85	.85	.85	.85
Philadelphia Dist.	2.50	.75	1.50	.85	.85	.85	.85
Pittsburgh Dist.	2.50	1.00	1.50	1.00	1.00	1.00	1.00
Sharpsville, Pa.	1.75	1.00	1.25	1.00	1.00	1.00	1.00
WESTERN:							
Chicago, Ill.	All sizes, $1.50, F. O. B. Chicago						
Detroit, Mich.	All sizes, 1.65, F. O. B. Detroit						
Ironton and Jackson, O.	2.00	1.25	1.50	1.25	1.25	1.25	1.25
Toledo, O.	All sizes, 2.00, F. O. B. Toledo						
Youngstown, Dover, Hubbard, Leetonia, and other Ohio points	1.75	1.00	1.25	1.00	1.00	1.00	1.00

Agricultural Lime and Hydrate Wholesale at Plant per Ton

	Agricultural Lime—Bulk	Agricultural Lime—Bags	Per Cent CaO	Per Cent MgO	Agricultural Hydrate Bags
EASTERN:					
Berkeley, R. I.		16.00	45	15	
Bellefonte, Pa.	7.25		95.5	.72 to .89	
Bridgeport, Pa.	7.50		55	44	10.25
Cavendish, Vt.		2.50 bbl. in car lots			
Cavetown, Md.	8.50				
Cedar Hollow, Devault, Rambo and Swedeland, Pa.	8.00	10.75 grd.	58	38	10.75
Chippewa, Lycoming Co., Pa.	5.00@5.50		78.67	1.33	
Espy, Pa.	4.50		82	1.25	
Grove City, Pa.	7.00 lmp.	9.00 grd.	75.48	0.80	10.00
Harrisburg, Pa.			70		12.45
Hollidaysburg, Pa.	6.50		94.25	.30	
Hyndman, Pa	5.00	8.50	80.23	2.87	
Lime Bluff, Pa.	5.00@6.25		78.67	1.33	
Lime Ridge, Pa.	5.00@6.25		80.56 to 62.56	3.87 to 1.75	
Mt. Union, Pa.	4.13		96.6		
Munns and Blakeslee, N. Y.	3.00	4.50	53.0		
Newburgh, N. Y.			57	38	8.00
New Castle, Pa.	3.50	4.50	47.6 to 50.4	0.62 to 1.12	
Ottawa, Ont.	12.00		95	1.5	
Rasindale, N. Y.	8.00		96 ($CaCO_3$)	5 ($MgCO_3$)	
Steuben, Pa., Dover Plains, N. Y., York, Pa.		8.50@9.50	70		10.75 to 12.00
West Rutland, Vt.	5.00	7.50	68	3	10.00
Williamsport, Pa.	5.00@5.50		80 to 90	2 to 3	
Zylontte Station, Adams, Mass.		8.00			
CENTRAL:					
Alton, Ill.	9.50				
Canton, O.		9.00			
Delaware, O.			50	5 to 12	8.50
Forest, O.	7.50				
Manistique, Mich.		10.00	54 & 95	40 & 1.75	10.00
Marblehead, O.	2.25	3.75			8.75
Mitchell, Ind.	9.00				11.00
Springfield, O.			33.62	17.73	9.00
Woodville, O.					9.75
SOUTHERN:					
Blakely, Ga.	3.00				
Bristol, Tenn.	5.50				
Chippewa, Fla.	5.00		80.0	15.0	
Hopkinsville, Ky.	3.00	6.50	98.75		
Hot Springs, N. C.	2.70	4.20			
Knoxville, Tenn.	2.00		57	3	
Louis Brook, Va.	8.00	10.25	90	1	
Newala, Ala.	8.50@9.00		99.33		
Ocala, Fla.	4.00	6.00 pulv.	98½ (dry basis)		
WESTERN:					
Bellins, Wash.					12.00
Kirtland, N. M.	10.00				
Knowles, Wis.	8.00	9.50	55	45	9.50
Lime, Ore.	15.00		91.48	0.58	
Oscas Island, Wash.		5.50			16.50
Tehachapi, Cal.	6.00	8.00	96	2	

Miscellaneous Sands per Ton at Plant

(Continued from preceding page)

Cleveland, O.—Core	1.25@1.50
Molding fine, molding coarse	1.75@2.25
Brass molding	1.25@2.00
Delaware, N. J.—Molding	1.50@2.00
Eau Claire, Wis.—Core	1.75
Roofing sand	3.00
Brass molding and sand blast	2.25
Fleetwood, Pa.—Silica heating	2.00
Franklin, Pa.—Core, traction and brass molding	2.00
Molding, fine	2.00
Molding, coarse	1.50@1.75
Gray Summit, Klondike and Pacific, Mo.—Molding fine	1.50@2.00
Greenville, Ill.—Molding coarse red	1.60
Hancock, Md.—Core and brass mldg.	1.65
Hellam, Pa.—Core	2.00
Joplin, Mo.—Stone sawing, flint	1.25
Kansas City, Mo.—Missouri River core	.85
Leesburg, Pa.—Core, furnace lining, molding fine and coarse	2.00
Mapleton, Pa.—Molding, fine and core, damp	2.00@2.50
Molding, fine, dry	3.00
Massillon, O.—Steel molding coarse	2.50
Furnace lining	3.00
Core	2.50
Michigan City, Ind.—Core, bank	.30@ .40
Millington, Ill.—Furnace lining, roofing, stone sawing	1.75
Core	1.50
Mineral Ridge, O.—Core, molding, sand blast, roofing, brass molding, etc., washed, screened (damp)	2.10
Montoursville, Pa.—Core, molding fine, traction, brass molding	1.25@2.00
Ohio—Various points:	
Iron molding, fine	1.50@2.25
Iron molding, coarse	1.75
Brass molding, minimum	2.00
Ottawa, Ill.—Brass molding	2.00
Ottawa, Ill.—Sand blast sand	3.50
Stone sawing	2.00
Core and roofing	2.00
Traction sand	2.00
Furnace lining	1.50
Thayers, Pa.—Core and traction	4.00
Traction	1.75
Roofing, not washed	2.00
Furnace lining	1.25
Warwick, O.—Core	2.25
Furnace lining, green	2.00
Dried and screened	2.25
Molding, fine	2.50
Molding, dried and screened	2.25
Green	1.75@2.00
Wedron, Ill.—Molding	.75@1.00
West Albany, N. Y.—Molding fine	1.75@2.25
Molding coarse	1.25
Brass molding	1.75
Zanesville, O.—Molding fine, brass molding	1.50
Traction	.75
Molding coarse	1.25

Ground Gypsum Rock, per Ton, at Plant

Castalia, O.—Raw, to cement mills	3.50
Crushed, not ground	3.00
Land plaster	6.00
Fort Dodge, Ia., bulk	3.50
Garhutt, N. Y.—Land plaster, bags	7.00
Grand Rapids, Mich.—Crushed gypsum	3.00
Ground gypsum rock	7.00
Gypsumville, Man., Can.	3.00
Oakfield, N. Y.	7.00
Sandusky, O.	6.00

Jute sacks, $3.00 extra; paper, $1.00 extra.

Ground Rock Phosphate at Plant, per Ton

Centreville and Gordonsburg, Tenn.—B. P. L., 60% to 70%; ton, 2240 lbs. Ground rock phosphate (90% thru 100 mesh)	6.00@8.00
Lump rock, 72% to 75%, B. P. L.	6.00@8.50
Centreville, Tenn.—B. P. L., 60%	7.00
B. P. L., 70% and 78%	8.00
Jacksonville (Fla.) District—Soft phosphate	10.00@12.00
(Add 2.50 for sacks)	
Mt. Pleasant, Tenn—(B. P. L., 70%)	
12%	6.00
13%	7.00
14%	8.00
Mt. Pleasant, Tenn.—B. P. L., 60% to 70%	6.00@8.00
Nichols, Fla.—Pebble, B. P. L., 70%	10.00
Phoslime. Fla.—Soft	14.00@17.50
Walls, Tenn.—B. P. L., 70.2%—	
To County Agri. Assns.	7.50
To others	7.75

Mississippi Valley Sand and Gravel Business Conditions

MEMPHIS, Tenn.—The August trade in sand, gravel and crushed stone is on a conspicuously good scale. It would be better had it not been for the talk of strikes and embargoes with the railroads early in the month. Deliveries have been under way all summer; old contracts are being finished and many new ones promulgated at this time. This applies to road, highway and railroad work, and several large construction jobs.

Dealers and contractors look for no cessation of activity the remainder of the year. Labor is somewhat scarce, yet there is more of it available in the south than one might think.

General News From The Rock Products Markets

More Developments in California Magnesite Are Promised

AS A RESULT of extensive experiments, an industrial enterprise for the manufacture of magnesite fire brick and by-products of carbonic acid gas, ground magnesite for woodstone and plaster, and possibly other products, is being organized in San Bernardino, Calif., according to the "Sun" of that city.

The promoters are W. H. Swan and C. B. Vandeventer, of San Bernardino, and John M. Nordheim and Dr. J. B. Sloan, of Los Angeles. They are the owners of large deposits of magnesite at Afton on the Salt Lake Railroad, 60 miles to the east of Yermo.

Experiments in the actual making of fire brick were conducted in an experimental plant near the Santa Fe right of way near the west city limits.

Advantages of magnesite as a material for the making of fire brick is that it will withstand a temperature of 6,500 degrees, Fahrenheit, before melting, while the ordinary so-called fire brick will melt at a temperature of 3,200 degrees. Bricks made of the magnesite owned by the local men have withstood heat tests which show it to be of high grade.

There are many uses for this class of brick. It is useful in foundry cupolas, boiler fire boxes and in any place where intense heat is necessary.

Magnesite is also a large producer of carbonic acid gas. The ground magnesite is used also for making of woodstone for kitchen sinks, in making of high grade plaster, and many other ways.

The local people have deposits with hundreds of thousands of tons actually in sight on the surface. The quarrying is purely a gravity proposition, and as the railroad is but a short distance away the cost of production will not be excessive.

At present the principal source of supply is from the Magdalena Bay district in Lower California, which makes the cost high. There is a small mine near Porterville in the central part of the state, and there was formerly a small mine near Winchester in Riverside County, but the cost of production there became too great to operate it succesfully on a commercial scale. So the local owners seem to be in a particularly fortunate position as to cost of the raw material.

Definite steps will be taken soon for the organization of a company. John M. Nordheim, one of the owners of the deposit, is a magnesite expert and has been engaged in the handling of the mineral all his life. He is one of the locaters of the deposits and has been conducting the experiments made here.

Cement Before Congressional Sub-Committee on H. C. L.

WASHINGTON, D. C.—Cement was brought into the hearings recently held on the high cost of living by a congressional sub-committee, when Hugh S. Jeffries, formerly of the Reclamation Service, told of his experiences with cement producers when working on the Roosevelt Dam in Arizona.

He states that when cement estimates for this dam were submitted they were believed to be too high by the engineers in charge, and Mr. Jeffries states "Part of the money was used to build a cement factory and manufacture cement. If I remember correctly, they saved about $600,000 on the cement that went into the project."

Building Material Included in Proposed Regulation

WASHINGTON, D. C.—"Building materials and supplies" will be considered necessaries of life, and maximum prices will be fixed by a Federal body, under the terms of a bill which has been introduced in Congress by Representative Huddleston of Alabama.

This bill provides for the creation of a War Trade Commission, to be composed of five members to be appointed by the President. The commission will have authority "to fix the maximum sale, use and service prices for necessaries, to adopt regulations for the distribution, transportation, sale, handling and storage of same, and to license dealers, agents and other handlers thereof."

It will be unlawful for any person to sell necessaries at prices greater than those fixed by the commission or, where such prices have not been fixed, at higher prices than those prevailing on November 11, 1918. In addition, every dealer who is not a producer of the goods he handles, will be required to secure a license to do business from the commission within fifteen days after the approval of the measure.

All dealers in necessaries will be required, where physically possible, to mark upon their products not only the price at which they are offered for sale but, as well, the original cost to them. Where this information can not be marked upon the commodity, the dealer will be required to furnish the information to any intended purchaser.

Violation of any of the provisions of the act will be punishable by a fine of not more than $5,000 or by imprisonment for not more than five years, or both. The sum of $1,000,000 is provided to carry the act into effect.

Building Material Prices to Stay High

WASHINGTON, D. C.—"I do not expect a general recession in the prices of building materials for several months, not because of profiteering but because of the general situation, which affects all commodities to a greater or less extent," said Secretary of Commerce Redfield, in a recent interview with newspaper men.

The Secretary pointed out that the high cost of living is not confined to the United States but is general throughout the world. There is a "commodity vacuum," as he phrased it, caused by the destruction of war, plus the normal consumption of peace, plus the absence from work of 20,000,000 men for four or five years. Against this, abroad, there is a greatly reduced surplus of funds. This is shown by the constant issues of paper money which have been made, so that, while there is apparently more money than ever in circulation, the purchasing power of money has decreased with a corresponding decrease in surplus. The result is that high prices naturally reign.

Secretary Redfield does not believe there is a general tendency to profiteer in the building industry and that the general rise in price and the demand which is coming from a greatly underbuilt world will naturally increase prices still further.

If we reach our pre-war level in eight years we will be doing very well, he declared.

Large Volume of Highway Work in Pennsylvania

STATE HIGHWAY COMMISSIONER SADLER, of Pennsylvania, has recently issued a summary of the State Highway Department's activities during the past six months, according to Good Roads.

The total mileage of projects advertised, including those covered by bids received on Aug. 5, is 601. This mileage includes 513.02 mi. of primary highway in townships and 28.17 mi. of road on the secondary highway system.

A total of 470.45 mi. of road has been awarded at a cost of $16,749,235.34. This includes 452.25 mi. of road on the primary system at a cost of $16,020,924.70.

Pavement types included in the work already awarded are summarized as follows: Reinforced concrete, 376.08 mi., $13,411,237.81; bituminous concrete, 63.38 mi., $2,750,437.71; vitrified brick, 5.7 mi., $320,177.42; bituminous resurfacing, 24.07 mi., $228,841.80; plain concrete, 1.25 mi., $38,540.60.

General News From The Rock Products Markets

National Farm Organization Board Asks Potash Embargo Removed

WASHINGTON, D. C.—Charging the American potash producers with leaving the farmers of the country without potash while they wage a fight to keep prices up, the National Board of Farm Organizations and the National Grange, in a letter to the War Trade Board, has asked for the immediate removal of the embargo on German potash, and a settlement of the questions of tariff and embargo on their merits.

"Articles in the newspapers, emanating undoubtedly from the American Potash Manufacturers' Association," it is declared in the letter, "make it apparent that every effort is being made to induce the War Trade Board to leave the embargo on German potash. The American potash industry is assuming grave responsibilities and will have much to explain to the American people if its efforts prove successful.

"According to the statements of the American potash manufacturers, they have about 35,000 tons of American potash on hand, their mills are idle, with possibly one exception—not because the present price is not profitable but because they are afraid of the importation of foreign potash which might reduce their profits on future manufacture. The embargo is still on, the farmer cannot get fertilizer abroad, the American plants are idle because they are not being guaranteed a profit on future products and therefore the American farmer, who stands in need of 250,000 to 400,000 tons of pure potash is denied the privilege of procuring it for the production of fall and succeeding crops for the benefit of all the American people to conserve a possible profit to a small group of Americans who desire to engage in potash manufacture.

"Under proper conditions and supervision we would favor encouragement of the home industry—especially for war emergencies and looking to an exhaustion of foreign supplies in the future. We are decidedly opposed, however, to the representation made by the American potash manufacturers and we are not satisfied that the prices demanded and expected by them are reasonable or fair. The prices which they are working so hard to have guaranteed them through embargo and pending legislation will increase the farmers' costs many millions of dollars and increase the cost of food accordingly. We believe the Federal Trade Commission by proper investigation would be the best judge of prices."

Oyster Shells for Road Surfaces in Louisiana

GALVESTON, Texas—Two of the great oyster shell reefs on the Gulf coast, one situated at Sabine, Texas, and the other at the mouth of the Atchafalaya river on Point Au Fer, La., are to be utilized for the construction or surfacing of good roads. The Sabine reef is valued at $15,000,000 and the Point Au Fer reef at $50,000,000. W. D. Haden of Galveston, has been awarded the contract for moving one million cubic feet of shells from the Point Au Fer reef and placing them upon highways in that part of Louisiana. He will also develop the reef at Sabine on an extensive scale.

Indiana Quarries Co. Lands Big State Contract

BEDFORD, IND.—The Indiana Quarries Co. has landed the contract for the stone work on the office buildings of the General Motors Co. at Detroit, Mich. The deal is said to involve $1,000,000 and is understood to be the largest single contract awarded the local stone belt. It means great activity and the employment of many stonemen here to complete the contract. The new building will be 15 stories high and cover an area of ground about a half mile in circumference.

County Operated Gravel Bank Gives Cost Data

HINDS COUNTY, MISS., is operating its own gravel bank for road work and claims the following results:

The pit is leased by the county under terms of 10 cents per cu. yd. On an average haul of 5 miles gravel costs $1.04 cents per cu. yd.; thus making a total cost of $1.14 per cu. yd.

The approximate cost of digging, loading and spreading the gravel is claimed to be 60 cents per cu. yd., and the cost of hauling is from 60 to 80 cents per cu. yd.

Demand for Gravel Is Half Capacity in Illinois

REPORTS from members of the Central Zone of the Illinois Sand and Gravel Producers' Association, show that so far the ratio of demand to capacity of plants has been about 50 per cent. Costs are ranging somewhat higher than a year ago. Most of these producers expressed optimism as regards prospects for the remainder of the season.

According to unoffiicial observation it seems that Indiana producers are operating with the same average results.

Open Top Cars for Coal Only in Illinois

TERMINAL MANAGER PAGE, Peoria, Ill., issued a circular under date of July 28th, prohibiting loading of open top cars with any other commodity than coal without permit from Mr. Page.

Ben Stone, business director of the Illinois Sand and Gravel Producers' Association, says "The result of this circular has been to virtually stop the movement of sand and gravel, and today work on a number of state road jobs is suspended because of non-deliveries of material. Bates & Rogers Company, contractors between Peoria and Springfield, I understand, have some two hundred men idle on this account.

"It appears that in order to obtain empty cars for sand and gravel loading the shippers must place their orders first with the initial line agent, stating specific destination for which cars are desired and delivering carrier. The order is transmitted by the agent to the office of the Terminal Manager and in the course of time a formal permit is issued.

"The plants on the Peoria Terminal have orders booked requiring capacity production. In order to keep the contractors going, shipments must be made with regularity and in quantities and grades specified. The road contracts held by these plants are mostly for Torpedo, to produce which it is necessary to have an outlet for the larger sizes.

"It is not practicable for any of the plants to place a blanket order for equipment to cover requirements over an extended period of time; we do not think this would be a desirable way to handle it from the carrier's viewpoint.

"The preponderance of movement of sand and gravel from the Peoria District is in the direction of coal mines. The daily movement of empty cars through and from Peoria Terminal is greatly in excess of requirements for loading of these materials."

Fight Rate Increase in New Orleans

BATON ROUGE, La.—The gravel rate at New Orleans has been taken under advisement, with a probable decision this week, W. M. Barrow, assistant attorney general and counsel for the Railroad Commission, says.

The Railroad Commission is fighting against an increase in rates by the Railroad Administration on gravel, sand, crushed stone, shells and other materials used in the building of good roads by parishes, cities and the state.

Passed By The Screens

Incorporations

Momence Phosphate and Limestone Co., Momence, Ill. Capital, $3,500.

Blue Knob Crushed Stone Co., Wooster; L. A. Yocum and others. Capital, $10,000.

Queensbury Stone Company, Hoosick Falls, $15,000; J. E. Flood, W. M. Bronk, J. B. Davis, Hudson Falls.

Tulsa, Okla.—Henryetta Spelter Co., O. A. Oesterle, Pres., Henryetta, Okla.; $750,000 acid-phosphate and sulphuric-acid plant.

The Blue Limestone Co. of Sandusky, O. Capital $30,000; incorporators C. Steffen, H. Binsack, F. J. Leblicq, E. J. Rosino and R. H. Shively.

A gravel plant is to be opened on White River and the Monon Railroad at Bloomfield, Ind. The new company is composed of G. V. Gladville, M. E. Dugger, O. E. Dugger, E. H. Dugger and Palmer Boles.

Daleville Lime Marl Corporation, Roanoke. H. H. Markley, president; S. B. Pace, secretary, Roanoke. Capital, $50,000. To mine, quarry and excavate lime marl, lime rock, clays, magnesia, talc, etc., from the earth.

Black Hills Rock Products Co., Rapid City, S. D. Manufacturing and marketing of Portland cement, lime, stucco, plaster and their products. John J. Farrar, Victor T. Jepsen, Fred W. Farrar, Albert R. Denu, all of Rapid City, S. D.

American Silica Products Co. of Indianapolis. Capital $300,000. The directors are Roy Sahm, John T. McNary, James A. Houck, Samuel A. Tescher and W. T. Young. The company will engage in mining silica at Jonesboro, Union County Il,inois, and the main offices will be located in Indianapolis. A factory for the manufacture of by-products will be maintained at Jonesboro.

Lime

The York Valley Lime Co., York Valley, Va., is still disabled due to a war measure. In 1918 the U. S. Government took over the coal that this company had contracted for and they were forced to shut down their kilns during that year. This was due to the fact that the lime is burned by the flame process which requires a gas coal which the government needed at the time. By this process the coal and stone are not mixed in the burning. Being situated on the P. R. R. the company was not able to obtain a gas coal of the required grade for their work—the gas coal available was of too high a sulphur content to enable lime to be made suitable for the steel industries to use. The steel companies used about two-thirds of the York Valley Lime Co. output. Since the demand for lime this year is not over 70 per cent of normal years and since the company's old trade has all contracted for lime from other plants, the plant was still unable to start. At present they have only orders to enable running at one-fourth capacity and so have not as yet started up. In this manner the company states that it has lost the trade built up during 17 years of business.

Manufacturers

Beaumont Manufacturing Company, Philadelphia, Pa., has just received from the press their catalog No. 42, describing rock crushers. A new catalog illustrating and describing their road grader will be ready for distribution by the time this notice appears. The Road Machinery Department is under the management of Mr. W. T. Ruth, who has had 18 years experience with road building machinery.

The American Road Machinery Co. of Fort Wayne, Ind., will if plans carry through as expected, move to Delphos, Ohio, where it is proposed to combine the five branch factories into one general plant. The company has purchased from the city of Delphos the grant of a strip of land in the municipally owned water works park there. A 99-year lease is wanted, with the agreement that the company will, within ten years time, erect improvements on the ground at a total cost of at least $200,000. The company is at present operating branch factories in Groton and Marathon, N. Y., Pennet Square, Pa., Delphos, O., and Fort Wayne, Ind.

Sand and Gravel

Premier Sand and Gravel Company, Wilmington, Del., $100,000; to acquire lands containing sand, stone, rock, gravel, etc.; T. L. Croteau, C. L. Rimlinger, C. H. Blaske, local Wilmington, Del., incorporators.

A proposed merger of the six companies controlled by F. A. Furst and his associates is to take place very soon, according to the Baltimore American. The proposed company will be the Arundel Sand & Gravel Co., and it is to have a capital of $7,000,000.

An important deposit of high grade silica sand has recently been discovered near Munroe, Louisiana. This deposit is estimated to contain about 18,000,000 yards of sand and gravel, underlain by large beds of glass sand. It is located near a railway, and convenient to water and gas.

Wage increases will be granted city laborers at Tiffin, Ohio, says the Herald, to meet the demands of employes at the city's stone crusher. The present rate of laborers in the service of the city is 30 cents an hour. Crusher workers will be given from 30 to 45 cents. From 50 to 70 cents an hour is allowed for teams, including the services of the drivers.

Pres. H. A. Boomer, of the L. E. & W. railroad with his chief engineer, says the LaFayette (Ind.) Journal, met with Allan Patterson of the Lewisburg Gravel Co. of LaFayette with a view of the L. E. & W. railroad leasing more gravel pit room to the Lewisburg Co. There is a fine pit of gravel on the north side of the present pit that the Lewisburg Co. is desirous of leasing. It is said that the Lewisburg people will secure the lease.

Retail Dealers

The Concrete Builders' Association (a non-stock corporation) of Milwaukee, Wis., nas changed its name to General Contractors Association of Milwaukee.

The Theresa Farmers Union of Marshville. Dodge County, Wis. Capital $5,000. Jos. Kohl, And. Greiner, Edwin Erdmann, incorporators. To deal in building materials, cement, tiling.

Hammond Hardware Co., Shawano, Wisconsin. Capital, $30,000. A. L. Hammond, S. B. Clow, Chas. Runge, incorporators. Dealers in hardware, cement, concrete, building materials of all kinds, silos, etc.

Perry Patent Fence Post Co., of Montpelier, Ind. Capital $100,000. To produce a patent cement post, the originator of which is Lawrence C. Perry. The offices are: President, L. C. Perry; vice-president, G. J. Hoy; secretary, T. C. Peterson and treasurer, J. E. Mulligan.

Mr. R. R. Shafter has returned to the Traylor Engineering & Manufacturing Co. sales organization after an absence of two years as general superintendent of the shipyard of the Traylor Shipbuilding Corporation. He will be district manager and will have charge of our New York office at 30 Church Street.

Personals

Tampton Aubuchon has resigned as general manager of the Louisville Industrial Foundation to enter industrial development business in that city.

Lieut. Col. H. S. Spackman having been in the corps of engineers since July 19, 1917, was discharged on July 18, 1918, and has returned to resume professional activities as president of the H. S. Spackman Engineering Co. While in service Mr. Spackman held many important offices both in this country and France.

OBITUARY

James A. Hart, president of, and a large stockholder in, the Chicago Gravel Company, and who had other substantial interests, died on July 18, at his Chicago home.

Potash

The potash factory at Crandon, Wis., which was owned and operated by Arthur Tracy of that city, burned to the ground last Friday night. The loss was about $1,300, covered by insurance. It will probably be rebuilt.

Cement

The Reiman Lime & Cement Company of Terre Haute, Ind., filed preliminary certificate of dissolution.

Hanover Portland Cement Co., Hanover, Ont., are remodeling their plant and are installing additional machinery.

A 10 per cent increase in pay has been granted all the employes of the Alpha Portland Cement Company at Easton, according to the Philadelphia Record.

Springfield, Ohio—Mills Brothers ordered 5,000 barrels of cement which will be used by Frank Hill Smith in the construction of the 5-story addition to the plant of The Crowell Publishing Co. in West High street. This is one of the largest orders booked this season.

Kansas—The contract for two and a half miles of concrete road west of Maywood was let yesterday afternoon by the Wyandotte county commissioners to Archie Turner, of Rosedale, for $68,600. The contractor's figure is $11 less than the engineers' estimate of cost.

The Continental Portland Cement Company of St. Louis has declared a dividend of three and one-half per cent and an extra dividend of one and one-half per cent upon its issued and outstanding capital stock, both preferred and common, excepting fractional shares, payable August 15 to stockholders of record on July 31.

The Advance Waterproof Cement Co. announce the removal of its offices to 175 W. Jackson Boulevard, Chicago. This company manufactures a reground Portland cement, which is claimed to have exceptional waterproofing qualities from its colloidal efficiency. It is ground to the fineness of talcum powder. The mills are at Blue Island, Ill.

Houston, Texas—The Texas Portland Cement Co. will double the capacity of its cement manufacturing plant, situated on the ship channel. It is stated that when the improvements are made the plant will have a daily capacity of 2,400 barrels. The demand for cement in Texas and for export shows a big increase during the last three months. The extensive highway construction program calls for large quantities of cement.

Exports of cement for May amounted to 201,502 barrels, valued at $618,228, according to a report just secured by the Washington Bureau of Rock Products from the Department of Commerce. This was a considerable increase over the exports of April, which totaled 117,690 barrels, valued at $354,374.

Cuba continues to be our largest customer for cement, with a purchase of 67,367 barrels, valued at $205,004, while Brazil is a close second with 67,241 barrels, valued at $195,275.

Mr. J. D. MacGregor, an American (vice president and general manager of the Compania Argentina de Cemento Portland, principally owned in the United States), has signed a contract on behalf of his American principals for the purchase of the Uruguayan Portland Cement Works, and the lime quarries at Verdun, Province of Minas, belonging to Messrs. Metzen, Vincenti and Co. The purchase price exceeds $1,000,000 gold. A new company has been formed under Uruguayan laws to be operated under the new management as of June 30, 1919.

Quarries

The Delaware River Quarry & Construction Co. are installing an additional crushing plant at Lambertville, New Jersey, capacity of 2,000 tons per day. Mr. Charles R. Hughes is the engineer in charge of the construction.

The West Coast Granite Co., Everett, Wash., has notified ROCK PRODUCTS that it is in the market for air compressors, all kinds of pneumatic tools, engines, derricks, hoists and complete equipment for a first class granite-cutting plant. The company is capitalized at $100,000. The plant is located on the Northern Pacific Railroad 17 miles from the coast. It will have a capacity of 500 cu. ft. per day and will turn out everything in the granite line. A. C. Jones is president and general manager; I. P. Hewitt is secretary and A. M. Light is general superintendent and engineer.

The Oliver Quartz Company, of Charlotte, N. C., and New York, N. Y., have discovered and developed a body of talc or, more accurately, pyrophyllite, at Hemp, Moore County, N. C. This material varies from a very soft grade, said to be suitable for tailors' crayons, to a compact variety which may be cut into pencils and crayons for the iron ond steel trade. Their pencil sawing plant has a maximum capacity of approximately 50 gross of crayons per day. This plant consists of one 24-inch bolting saw, one 20-inch slabbing saw, and three pencil saws, ranging from 10 to 16 inches in diameter. These circular saws are all specially tempered and hollow ground for sawing talc. Experience has shown that the average saw will not last longer than 15 to 20 minutes of actual sawing before it has to be resharpened and reset. Automatic saw sharpeners are used which require very little labor. A good saw operator can saw out 75 to 100 pencils in 15 minutes. In addition to the sawing plant, a grinding plant is in operation which has a capacity of 75 tons per day of 200-mesh material.

A new plant for the grinding of talc and soapstone has recently been completed at Henry, Franklin County, Virginia. The mine and mill are owned and operated by The Franklin Soapstone Products Corporation, of Roanoke, Virginia. The mill has a reported capacity of 200 tons of finely pulverized material per day. It is equipped with a No. 2 Sturtevant Rotary Crusher, a Fuller-Lehigh Rotary Dryer, and two 42-in. Fuller-Lehigh Pulverizer Mills. The crusher, dryer, and several elevators and conveyors are driven by a 50 h. p. Vim engine while the pulverizers are driven by a 150 h. p. Corliss type engine. The material now being ground is a soapstone, and its principal markets will be found in the paint filler, foundry facing, composition roofing, and rubber trades.

Employes of the St. Paul, Ind., stone quarries, according to the News of Greensburg, Ind., returned to their work today after being out for several days on a strike for higher wages. The men asked $3.50; an increase of 50 cents which was granted, it is understood. The quarries are owned by a Cincinnati corporation and L. R. Yater has charge of operating them.

The Somerset Stone Crushing Co., of Bernardsville, N. J., gets its material from a quarry leased on a long term of years by A. B. Nelson. Mr. Nelson is rebuilding the plant and contemplates installing a system of belt conveyors for storage piles and loading cars.

The Chicago Union Lime Co., of Chicago, Ill., which produces crushed rock and lime exclusively for the local market has been greatly handicapped by the tie-up in building in Chicago. As soon as the building activities are resumed, however, the plant will resume its full capacity output.

Specimens of rock from the company's ledges have been submitted to the Minnesota Highway commission and have been tested and accepted by it for use in state road building.

Walter Derr, of Ivy Rock, C. C. Bland, of Birdsboro, and others, now have 40 men at work at the Samuel Menton trap rock quarries at Rattlesnake Hill. The men are getting machinery in order as the quarry has not been operated for over four years.

The Church Stone Company, incorporated, of Beattyville, Lee county, Kentucky, has given notice it is dissolving and closing up affairs, according to the Beattyville, Ky., Enterprise.

Roanoke, Va.—Lime. United States Brick & Potash Corp.; lime-pulverizing factory; lime-kiln; 200 tons daily capacity each. Taken from the Manufacturers' Record, Baltimore, Md.

The Linwood Quarries Co. of Davenport, Ia., gives notice in the Davenport Democrat of its dissolution. which took place on July 15, 1919.

A valuable deposit of limestone has been discovered on the farm of Judge James S. Courtney, near Metropolis, Ill., and a sample has been tested at the Illinois state experiment station. It shows 95.18 per cent and well adapted for use on acid soil. The deposit is large and the owner intends to install a crusher at once.

The City Council of Minneapolis, Minn., is considering complaints of citizens against stone quarries on Johnson Street between Broadway and 18th Avenue. A minority committee report asks for the passage of an ordinance providing for license for quarries, while the majority report did not favor passage of such bill. According to Assistant City Engineer E. P. Dutton, the passage of such an ordinance would be an attempt to force the abandonment of quarries, which would hamper the city paving supply.

The Thirteen Island Lake feldspar mines, which are near Kingston, Canada, and which is managed by Ralph Scott, has been purchased from the estate of the late Senator H. W. Richardson.

St. Louis, Mo.—Tests made by the University of Missouri on limestone taken from farms in Callaway county demonstrate that the stone contains 95 per cent pure calcium carbonate and that its use on sour land will benefit the land. Farmers of this county have decided to erect crushers to pulverize limestone and the tests have encouraged them to proceed.

Luverne, Minn.—If present plans are fully met Luverne's new Quartzite Quarries, Inc., will have a stone crushing plant within 90 days, according to the Herald.

The board of directors and officers are J. E. Treat, president; Wm. Jacobsen, 1st vice president; J. P. Coffey, 2nd vice president; S. A. Cross, treasurer; Harper Shaffer, secretary; A. A. Anderson, assistant secretary, and Frank F. Michael.

The company owns about 130 acres of land lying on the west side of the Rock Island right-of-way.

It is planned to install a crushing plant that will have a capacity of from 500 to 600 tons of rock a day, and to increase the output as fast as the demand warrants. The company is planning to utilize electric power from the municipal plant of this city. All the various sizes of crushed rock will be available at the quarries from the outset.

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